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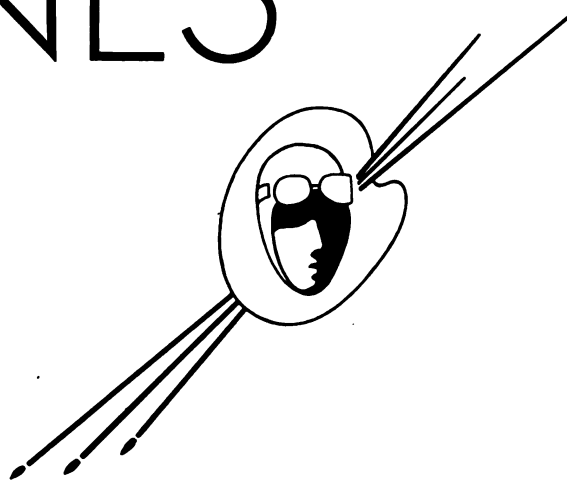
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AMERICA'S FIGHTING PLANES

AMERICA'S FIGHTING PLANES



IN ACTION



TEXT & ILLUSTRATIONS BY Reed Kinert

NEW YORK · THE MACMILLAN COMPANY · 1943

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AUTHOR'S NOTE

IN EVER INCREASING quantities our aircraft are proving their worth on all fronts, all over the world. Constantly being improved to meet battle requirements, they are rolling off assembly lines in quantities to overwhelm our enemies.

Combat-tested, the GRUMMAN Avenger is a torpedo-bomber without peer. Our *Fortress* and *Liberator* bombers are blasting the enemy on the ground, and knocking the vaunted *Focke-Wulf 190* and the *Zero* out of the sky.

In this book I have tried to include all U.S. military aircraft now in production or in quantity use. If any are missing, it is because new models are coming out faster than anyone can keep pace. The order in which the planes appear in this book has no relation to their importance in our air forces. Since so many craft have multiple uses, it seemed best not to classify them in groups but to arrange them in as near alphabetical order as the layout of color printing allowed. Since descriptive names like the *Corsair*, *Commando*, *Mustang*, are now appearing in official Army and Navy dispatches, I have used them here. These well chosen titles for our warriors of the air are destined to become household words all over the world.

A picture, to justify itself, should depict something a photograph cannot, so you'll find my planes "in action." As my own illustrator I can choose my backgrounds. The planes can be in fluffy clouds or on top of an overcast. They may be in combat over the African desert, or the deep waters of the Pacific.

My work as flight instructor gives me a personal interest in the war in the air. My former student pilots are in combat all over the globe. Drawing is my hobby, and in these pages I have tried to express the great part our Air Services are playing today. The pictures tell the story.

REED KINERT
Flight Instructor
Ryan Field, California

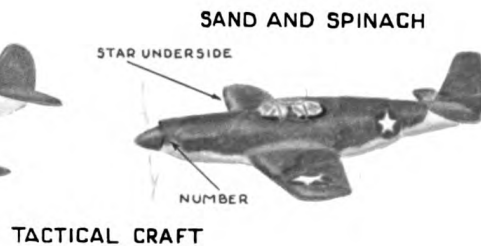
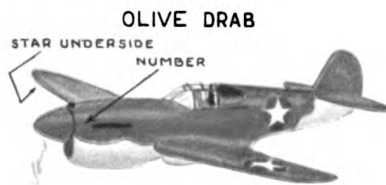
CONTENTS

Military Aircraft Markings	11
BEEHCRAFT GB-1	12
BEEHCRAFT F-2, AT-11, JRB-1 & AT-10	14
BOEING AT-15	16
Airacobra BELL P-39	18
Buffalo BREWSTER F2A	20
Avenger GRUMMAN TBF	22
Buccaneer BREWSTER SB2A	24
Bobcat CESSNA AT-17	26
Blimp GOODYEAR TYPE K	28
Cadet CULVER PQ-8	30
Catalina CONSOLIDATED PBV	32
Commando CURTISS C-46	34
Constellation LOCKHEED C-69	36
Coronado CONSOLIDATED PB2Y	38
Cornell FAIRCHILD PT-26	40
Corsair VOUGHT F4U	42
CURTISS AT-9	44
Dauntless DOUGLAS SBD	46
Excalibur SIKORSKY JRS	48
FAIRCHILD PT-19	50
FAIRCHILD AT-13 & 14	52
✓ Flying Fortress BOEING B-17	54
Forwarder FAIRCHILD C-61	56
FLEETWINGS BT-12	58
Falcon CURTISS SNC	60
Gliders	62
Grasshoppers TAYLORCRAFT L-2	64
Cub PIPER L-4	64
Defender AERONCA L-3	64
Harvard NORTH AMERICAN AT-6	66
Helldiver CURTISS SB2C	68
✓ Havoc DOUGLAS A-20	70

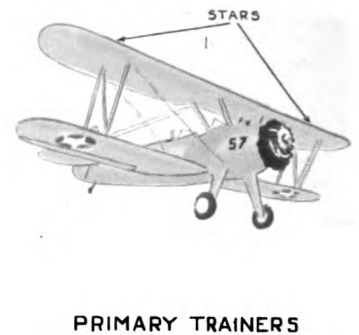
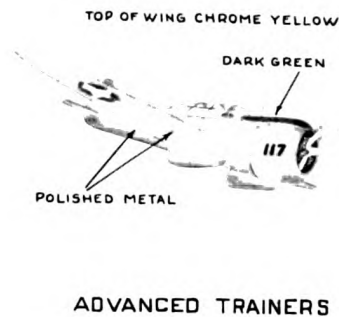
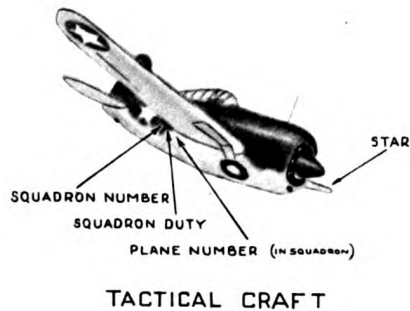
Kingfisher VOUGHT OS2U	72
HOWARD GH-1	74
Lancer REPUBLIC P-43	76
✓Hudson LOCKHEED A-29	78
NAVY N3N	80
✓Liberator CONSOLIDATED B-24	82
NORTH AMERICAN BT-14	84
Lightning LOCKHEED P-38	86
Owl CURTISS O-52	88
✓Marauder MARTIN B-26	90
Reliant STINSON AT-19	92
Mariner MARTIN PBM	94
REPUBLIC AT-12	96
Mars MARTIN PB2M	98
Recruit RYAN PT-22	100
✓Mitchell NORTH AMERICAN B-25	102
Seagull CURTISS SO3C	104
Mustang NORTH AMERICAN P-51	106
Sentinel STINSON L-5	108
Skymaster DOUGLAS C-54	110
SPARTAN NP-1	112
Skytrain DOUGLAS C-47	114
Skytrooper DOUGLAS C-53	114
Stratoliner BOEING C-75	116
Stearman PT-13B-17 & 18	118
Tutor TIMM N2T	120
Thunderbolt REPUBLIC P-47	122
Valiant VULTEE BT-13A & 15	124
Vengeance VULTEE A-31	126
Vanguard VULTEE P-66	128
✓Ventura LOCKHEED B-34	130
Vigilant VULTEE L-1	132
Warhawk CURTISS P-40F	134
Vindicator VOUGHT SB2U	136
Wildcat GRUMMAN F4F-4	138
Widgeon & Goose GRUMMAN J4F & JRF	140
Obsolescent Planes, Army & Navy	142
Index to Full Page Illustrations	144

AMERICA'S FIGHTING PLANES

U.S. ARMY



U.S. NAVY



MILITARY AIRCRAFT MARKINGS

THE SECOND WORLD WAR has resulted in a change in military-aircraft markings. Brilliant colors, especially on tactical craft, have disappeared. The red circle has been painted out of the stars because of the likeness to the red disk of Nippon-aircraft markings. Camouflaging is the rule for tactical planes.

ARMY AIR FORCE PRIMARY, BASIC, and ADVANCED TRAINERS now have all-silver or natural metal finishes. A large number is painted on the fuselage sides of trainers, and a corresponding number, smaller in size, is painted on the nose, to aid in dispatching and location by pilots when assigned to their planes. There is a star near each wing tip on the underside, and on each topside wing panel—a total of four stars on each trainer.

ARMY TACTICAL PLANES are camouflaged on the topsides with a dull nonreflecting paint, either completely olive-drab or sand and spinach. The undersides are often painted a nonreflecting pale blue to blend with the sky. For overwater operations a relatively few Army tactical craft have been painted navy blue in the same camouflage scheme as for landplanes. A white star inside a blue circular background appears on the underside of the right wing panel, near the tip, and another star is painted on the topside left wing. Small numbers are painted on the nose, and the serial number on the rudder fin. Plane numbers on the sides of military aircraft are usually the last two or three numbers of that aircraft's serial number. The star insignia is on the fuselage sides, near the tail surfaces.

NAVY, COAST GUARD, and MARINE COMBAT AIRPLANES have a dark blue, nonreflecting finish on the top surfaces. The undersides are painted a nonreflecting light gray. All planes have a white-star insignia painted on the wings against a circular field of dark blue. This insignia is the same in both the Army and the Navy. A star, usually larger in size than that on Army craft, is painted on the fuselage side. Most planes carry very small white identification numbers on the side of the fuselage.

NAVY PRIMARY TRAINERS are painted yellow all over, and advanced trainers have silver fuselages with the top wing panels painted yellow. All training planes also carry the star insignia.

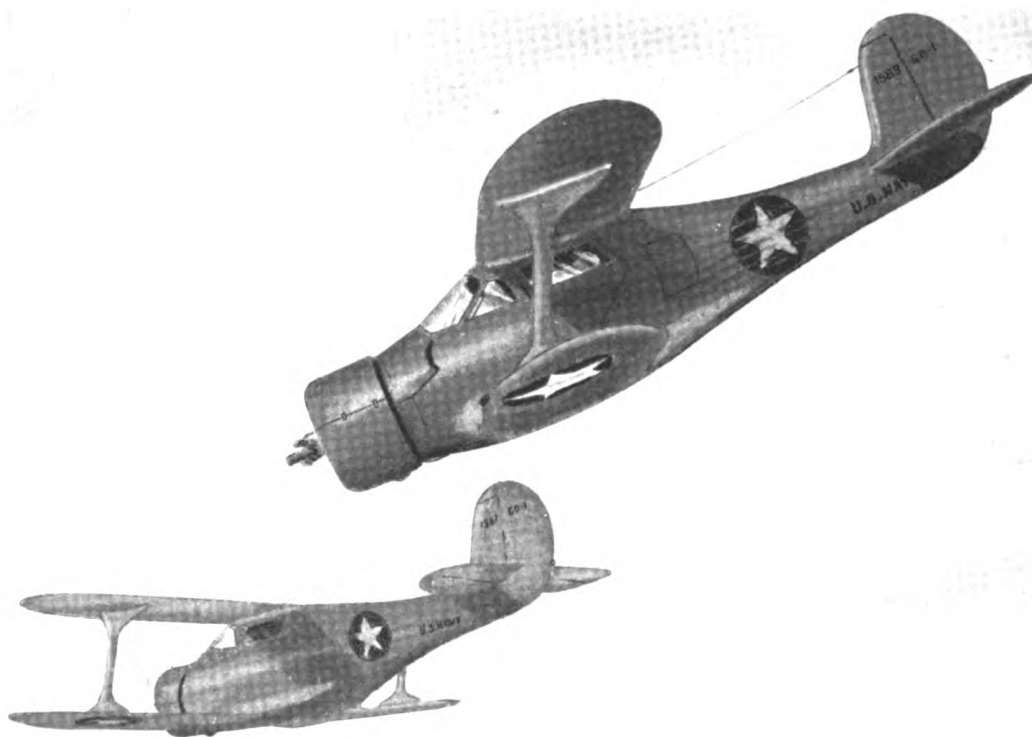
BEEHCRAFT GB-1

ESSENTIALLY the same airplane as the commercial model D-17S, this craft is one of the few biplanes in production today and is the only one with retractable landing gear.

The "Beech" is very clean in design and unusual in appearance, for the lower wing panels extend forward of the upper panels. By incorporating this negative stagger in wing placement, the lower wing affords a platform to stand on while fueling the gas tanks, which are placed in the upper wing. It also allows the landing gear to be fully and cleanly retractable and, besides, it assures safety in case of a forced landing on rough terrain, wheels up. Damage to the underparts in wheel-up landings has been found to be small; for BEEHCRAFT lacks any tendency to nose over, and the lower wing, by its proximity to the ground, builds up an air cushion and lands slowly. With the extreme reliability of aircraft engines being built today, the eventuality of a forced landing is negligible; but its wing placement is an important safety feature of the GB-1.

The fastest plane of its class, the "Beech" carries five persons and their baggage. It has a guaranteed cruising speed of 202 m.p.h., using 300 h.p. at cruising altitude of 9600 feet. The Wasp Jr. engine delivers 450 h.p. for take-off. Landing speed is only 50 m.p.h. with wing flaps down. Fuselage is constructed of steel tubing with spruce and plywood fairing to shape contour. Wings are built up of solid spruce spars and ribs, fabric-covered. Leading edges of wings are Duralumin-covered for smoothness.

Known by the Navy as the GB-1 AND 2 personnel transport, this plane's Army Air Force counterpart is the C-43.



BEECHCRAFT F-2, AT-11, JRB-1, AT-10

ACCLAIMED by pilots as the finest twin-engined airplanes in their horsepower class, these BEECHCRAFT, known commercially as the Model 18's, are being used in many capacities and adaptations in all branches of the services.

The ARMY F-2 (top), an all-metal craft, is equipped for high-altitude photography. It carries two multiple-lens mapping cameras, mounted in tandem within the cabin, and oxygen equipment for high-altitude use. This craft is used to train photographic crews, and for experimental-photography work. Similar in appearance to the F-2 are the ARMY C-45 and C-45A and the NAVY JRB-2—all personnel transports.

The ARMY AT-11 (second from top) is an advanced trainer used for the specialized training of bombardiers and gunners. It is equipped with flexible machine guns and bomb racks for the instruction of a crew of three or four men, depending on the instructional mission. It carries eight 100 pound bombs. All-metal, the AT-11 has a span of 47 feet and retractable landing gear and is powered by two 450 h.p. Wasp Jr. engines. Cruising speed is about 205 m.p.h. at 12,000 feet, and range is near 1000 miles.

The NAVY JRB-1 (third from top) was developed primarily for photographic work but is also used for special observation and as a utility transport. Basically the same airplane as the JRB-2 and the ARMY C-45, its appearance is modified by a streamlined and raised extension added to the cockpit enclosure, to provide wide visibility in all directions for pilot and observer.

The ARMY AT-10 (bottom) is a transitional advanced trainer used as a steppingstone from single-engined planes to twin-engine medium bombers and cargo planes. Principally produced of plywood and nonstrategic materials, this airplane is equipped with all the devices required for the operation of the larger tactical aircraft, including a full complement of instruments and an automatic pilot. It is powered by two 280 h.p. engines and is identical in appearance to the BEECHCRAFT twin-engine plane with the exception of the rudder, which is the single type.



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BOEING AT-15

MANUFACTURED by the Boeing Airplane Company at one of its Middle Western plants, the twin-engine AT-15 is the answer to crew-training problems. It is the first advanced-training plane to be specifically designed and equipped for the group tactical training of pilots, copilots, bombardiers, navigators, and gun crews.

To provide the desired training facilities the airplane has constant-speed propellers, radio compass, an automatic pilot, and a full complement of flight instruments and radio equipment. It is also fitted with a flexible machine gun, a flexible camera gun to register hits, a powered gun turret, and a bombbay rack for a moderate capacity of practice bombs. As on tactical aircraft, the bombs are inside the fuselage and trap doors swing open for their release.

Looking very much like a twin-engine medium bomber, the AT-15 crew trainer is constructed of steel tubing with wood fairing. The fuselage is fabric-covered and the wings and tail surfaces are plywood-covered. Powered by two 550 h.p. Pratt and Whitney Wasp 9-cylinder radial air-cooled engines, it has a top speed of well over 200 m.p.h. It cruises at 190 m.p.h. and has a range of 800 miles or more, with a crew of five. Slightly over 12 feet high, it is 42 feet long and has a wingspan of 60 feet.

Because of its twin-engine efficiency and its ability to fly on one engine, the BOEING AT-15 could be fitted out for offshore coastal-patrol work. Part or all of its bomb-load capacity could be replaced by an equal load of depth charges for use against submarines. In certain areas, where our Air Force holds complete aerial supremacy, the AT-15 could do bombing and ground-attack work.

The BOEING is one of the largest planes to be so constructed today and is following the present trend of using wood, plywood and fabric in design of trainers to release metals to combat craft.



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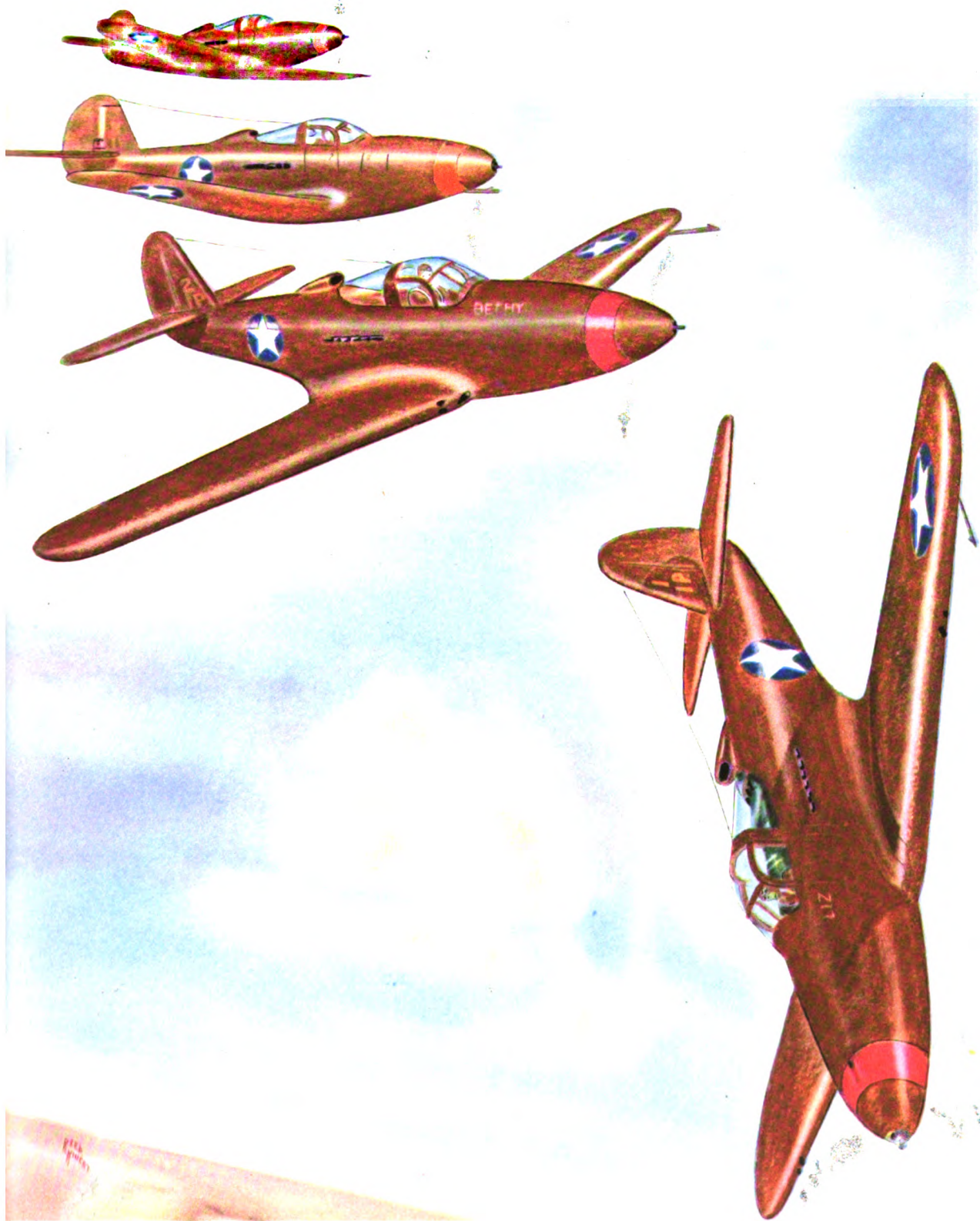
AIRACOBRA · BELL P-39

THE AIRACOBRA has probably been in the news more than any other combat plane since 1939. A single shot, struck home from the "flying cannon," will blast the biggest bomber from the sky.

The BELL P-39 is unique in design in that it is the only plane in which the engine is placed aft of the pilot seat, and power supplied the propeller through a drive shaft running under the pilot's seat up to the nose. This engine placement near the center of gravity affords greater maneuverability and unobstructed visibility for the pilot. It also allows the nose to be clearly streamlined, and, by having the engine weight centered, fewer excessive strains are imposed on the plane's structural members in sharp turns or pull-outs from fast dives. Pilots report that the P-39, the first military combat plane to use a tricycle landing gear, is particularly satisfactory in operating out of small fields and in cross-wind take-offs and landings.

Powered by the Allison V-type liquid-cooled 12 cylinder engine of 1150 or more horsepower, the *Airacobra* mounts either a 20 mm. or a 37 mm. cannon in the propeller shaft; two .50 caliber machine guns atop the nose, and two machine guns in each wing, either .30 or .50 caliber. This withering fire power has been used to advantage to knock out great German tank formations, and the full complement of guns is brought to bear on troops, supply trucks, and trains. Designed for low levels, the *Airacobra* operates best between sea level and 18,000 feet. It is equipped to carry a belly fuel tank for long missions, and for short missions the fuel-tank rack can be used to carry a bomb.

In the southwest Pacific, *Airacobra* squadrons have been in action beside Marine *Wildcat* fighters, clearing the way for attack and for dive bombers to plant their bombs free of opposition from the sky. Faster than the much-vaunted Jap Zero in level flight and much faster in dives, the *Airacobra* has a top speed officially announced as 398 m.p.h. with full military load.



BUFFALO · BREWSTER F2A

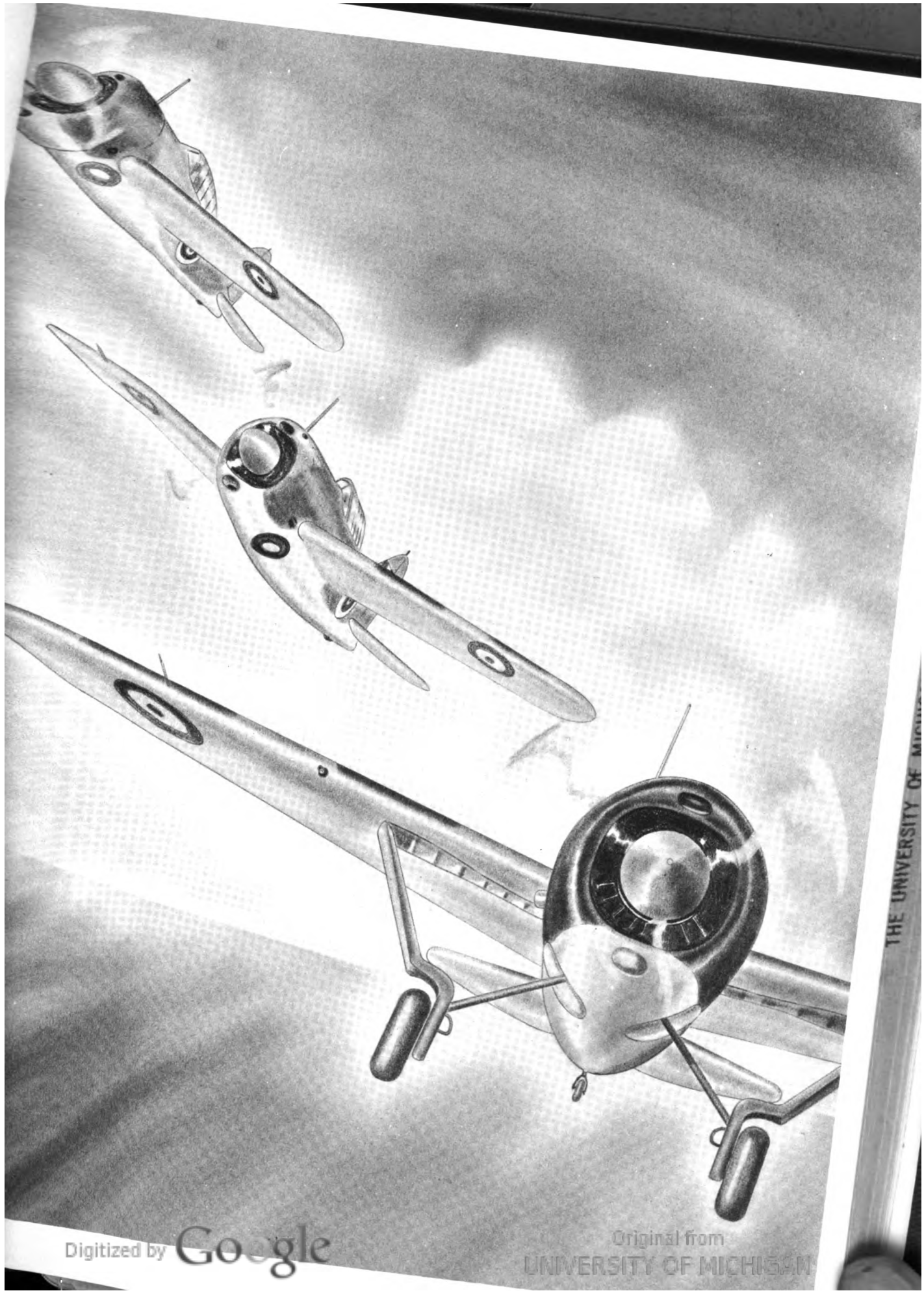
THE BREWSTER BUFFALO has already made a memorable war record. It was used early in the war by the British in the Near East and by the Dutch in the East Indies. The *Buffaloes*, side by side with GRUMMAN *Wildcats*, both flown by Marines, fought in the defense of Midway. A New Zealand pilot, flying a *Buffalo*, shot down the first Japanese plane, a bomber, in the battle for Singapore. This fighter has also seen much combat service with the R. A. F. over England and in Egypt.

Armament of the *Buffalo* consists of four .50 caliber machine guns, firing forward, two in the fuselage nose and one in each wing. Two 100 pound bombs are mounted on external racks on the undersides of the wings. Protective armor consists of an armor-plated cockpit with a bullet-proof windshield and self-sealing fuel and oil tanks. All-metal, the plane is constructed to withstand twelve times the normal gravity load. It was originally designed as a carrier-based aircraft but serves on land also.

The cantilever wing is placed in mid-position and carries hydraulically operated trailing-edge flaps. These may be actuated manually from the cockpit.

Powered by an 1100 or a 1200 h.p. Wright Cyclone engine, the *Buffalo* F3A-3 has a speed of 350 m.p.h. with full military load. Landing speed is 73 m.p.h., climb is 3070 feet per minute, and range is 1472 miles. Wingspan is 35 feet, length 25 feet 8 inches, height over 12 feet; the ship has a gross weight of 6520 pounds.

The *Buffalo* is no longer in production, and BREWSTER is busily turning out a new fighter model, called a *Battler* F3A-1, a prototype of the VOUGHT F4U.



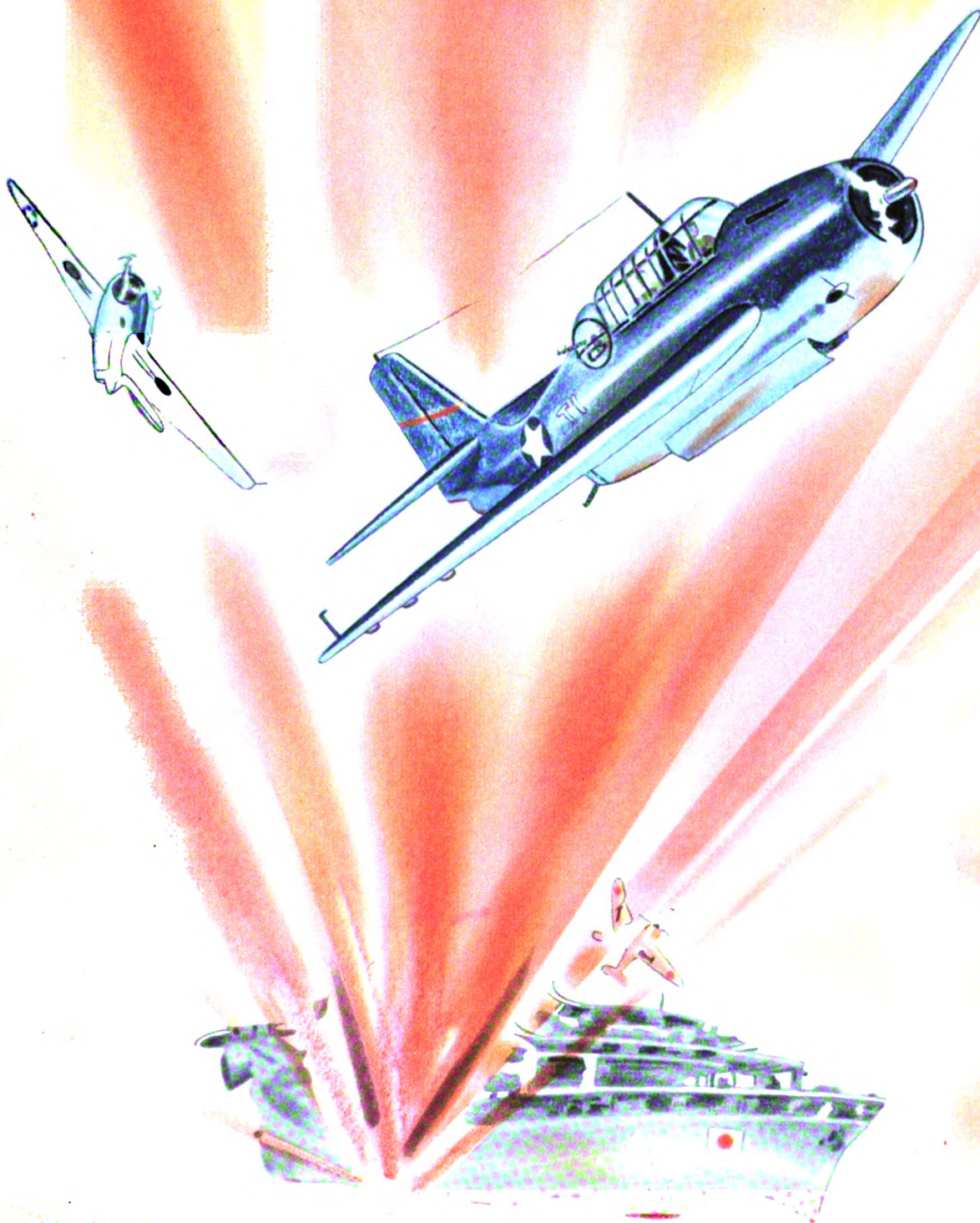
THE UNIVERSITY OF MICHIGAN

AVENGER · GRUMMAN TBF

THE GRUMMAN TBF-1 was an unpleasant surprise weapon to the Japs when they attempted to storm Midway Island in June, 1942. Delivering a full-size torpedo of 2000 pounds from inside its fuselage, the Avenger helped to build the total of 22 Jap ships sunk or damaged and 275 Jap planes destroyed. Pulling up under the Avenger for what it thought was a "cold-turkey shot," many a Jap plane has been blasted by the gunner on the underside of the fuselage near the tail.

Already famous, the Avenger is the largest and heaviest of carrier-based aircraft. Heavily armored and heavily armed, it is the deadliest carrier-based torpedo-bombing plane in the world.

Powered by a 1700 h.p. Wright Cyclone engine, the Avenger has a top speed of around 270 m.p.h. and has good climb and maneuverability. Its crew consists of pilot, radio-navigator, and two gunners. Wingspan is just over 54 feet; length is 41 feet; gross weight is about 12,000 pounds, with a cruising range of 1400 miles. The new TBF Avenger, because of its high speed, is less vulnerable than other carrier-based torpedo planes to enemy antiaircraft and machine-gun fire during its approach. In the critical zone, 3000 to 1000 yards, the Avenger's speed enables the use of swift evasive tactics. Well-trained pilots can usually throw off enemy gunners. By the same type of high-speed maneuvering, after torpedoes are released, losses can be kept at a small ratio. The most determined anti-aircraft gunners cannot cope with a full-scale torpedo-plane attack, in which eighteen planes approach at high speed from every point of the compass. At the relatively close range of 1200 yards, a fast torpedo plane is a small and difficult target. In future attacks it is likely that our massed torpedo attacks will include 300 planes or more if the size of the enemy surface force warrants it.



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BUCCANEER · BREWSTER SB2A-1

THE BREWSTER SB2A-1 will appear more conspicuously in the news from now on. Already the "Buc" is being regularly delivered in quantity to the Navy for important missions as a scout bomber.

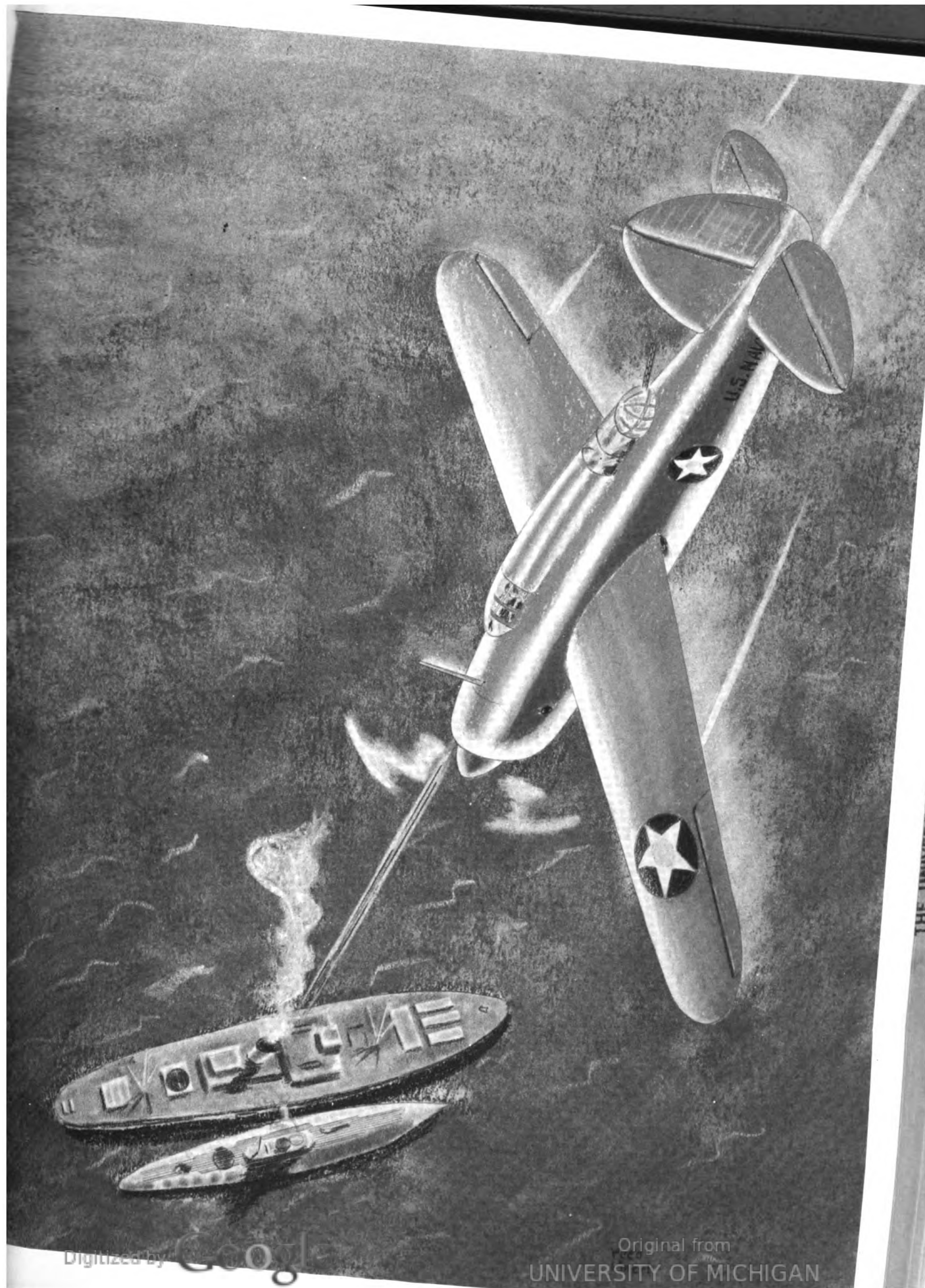
Still on the secret list, most details of the SB2A-1 are restricted. Powered by a 1700 h.p. double row Wright Cyclone engine, the *Buccaneer* is one of the world's fastest dive bombers; it has a top speed of around 350 m.p.h., a cruising speed of 250 m.p.h. and a range of about 1100 miles. It has a gross weight of 11,000 pounds and a wingspan of 47 feet, and is 39 feet in length. Bomb load is at one ton, carrying either one large bomb or several smaller ones. It is of all-metal construction and combines ample speed with long range.

The *Buccaneer's* relatively high top speed is due to efficient wing taper, flush-surfaced riveting over the entire external surface, complete enclosure of all devices within the structure, clean and full retraction of the landing gear, engine cowl designed for satisfactory cooling with minimum loss from air-cooling drag, and efficient design of the propeller spinner in conjunction with the propeller-blade cuffs.

The plane has protective armor as on all U. S. combat aircraft. Armament probably consists of at least four .50 caliber machine guns firing forward and two .30 caliber machine guns swivel-mounted in the rear gunner's cockpit.

The development of the scout bomber, often referred to as the dive bomber, has extended over a considerable period of time but has only recently been perfected. During World War I shallow dive or glide bombing was widely employed, but no steep dives were made. Operations require that equipment to permit landing aboard aircraft carriers be incorporated in scout-bomber construction. To withstand the high stresses imposed upon its structure by such operations and to recover from steep, high-speed dives, rugged strength is called for. The *Buccaneer* meets all these requirements with some to spare.

The English version is known as the *Bermuda*.



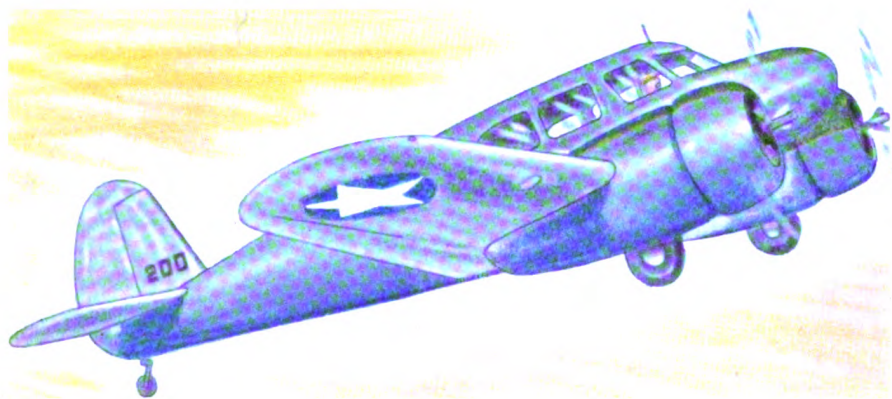
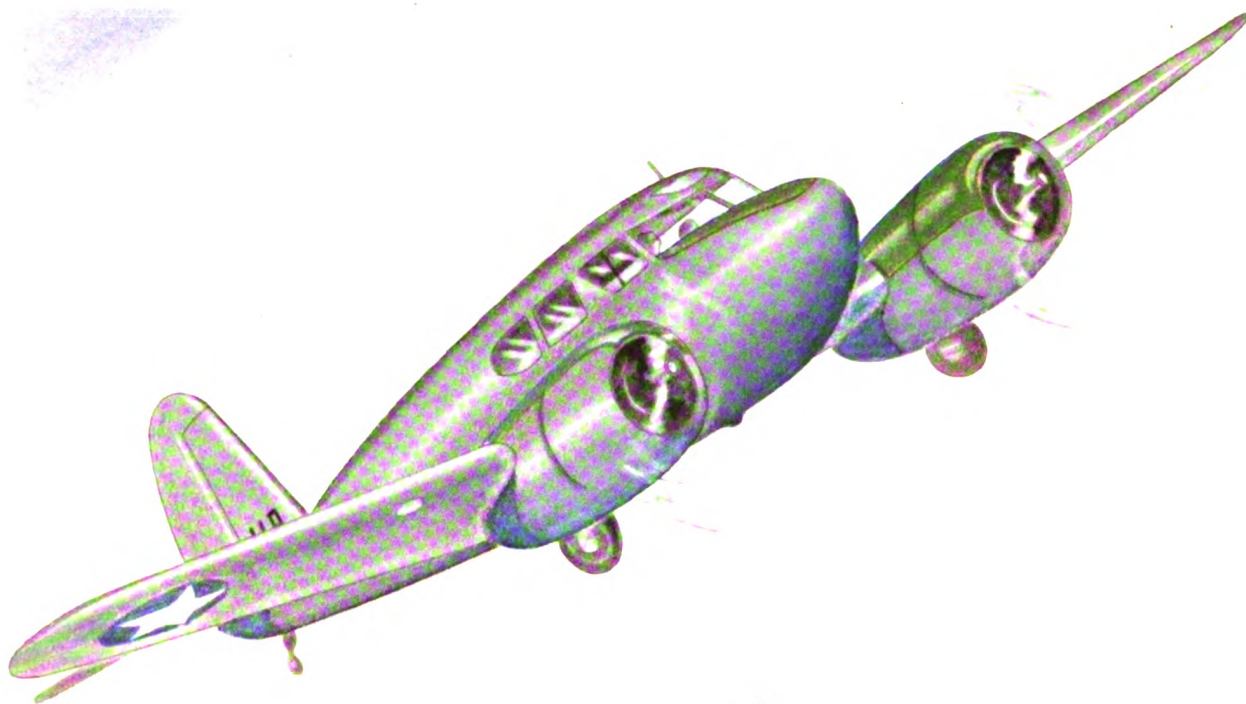
BOBCAT · CESSNA AT-17

CESSNA HOLDS the distinction of producing more twin-engine bomber-pilot trainers than the combined output of all other U. S. aircraft manufacturers.

Three twin-engine models have been built by CESSNA and all are alike in external appearance except for a slight difference in window arrangement. Interiors vary with operational changes to suit different training purposes. All military CESSNA models are evolved from the commercial T-50 model. The earliest military model was the AT-8; it was delivered in quantity to the Royal Canadian Air Force, which named it *Crane*. These planes are used by the R.C.A.F. and the A.A.F. for navigational and twin-engine transition trainers; the R.C.A.F. models are painted a brilliant chrome yellow for easy spotting in the air and on the ground if forced down in isolated areas. The *Bobcat* AT-17 is the latest-model CESSNA and is the same in appearance as the AT-8 *Crane*. Performance and other features are the same.

Powered by two Jacobs engines of 245 h.p. (available for take-off), the *Bobcat* has a top speed of about 185 m.p.h. and a cruising speed of 160 m.p.h. Landing speed, with flaps, is around 60 m.p.h. Climb, at sea level, is 1525 feet per minute. Usable ceiling is 6000 feet with one engine and 22,000 feet with both engines. Maximum cruising range is 1000 miles and gross weight is 5000 pounds or more. Fuselage construction is of steel tubing and plywood, fabric-covered. The wing is built up of spruce spars with ribs of spruce and leading edges and wing tips of plywood, fabric-covered. Wingspan is 42 feet, length is nearly 33 feet, and height is 10 feet. The landing gear does not retract fully, so damage would be slight in case of a wheels-up landing.

The *Bobcat* is also made in a cargo version, the C-78, and is used for the transportation of officers and administrative personnel of the Army Air Force.



BLIMP · GOODYEAR TYPE K

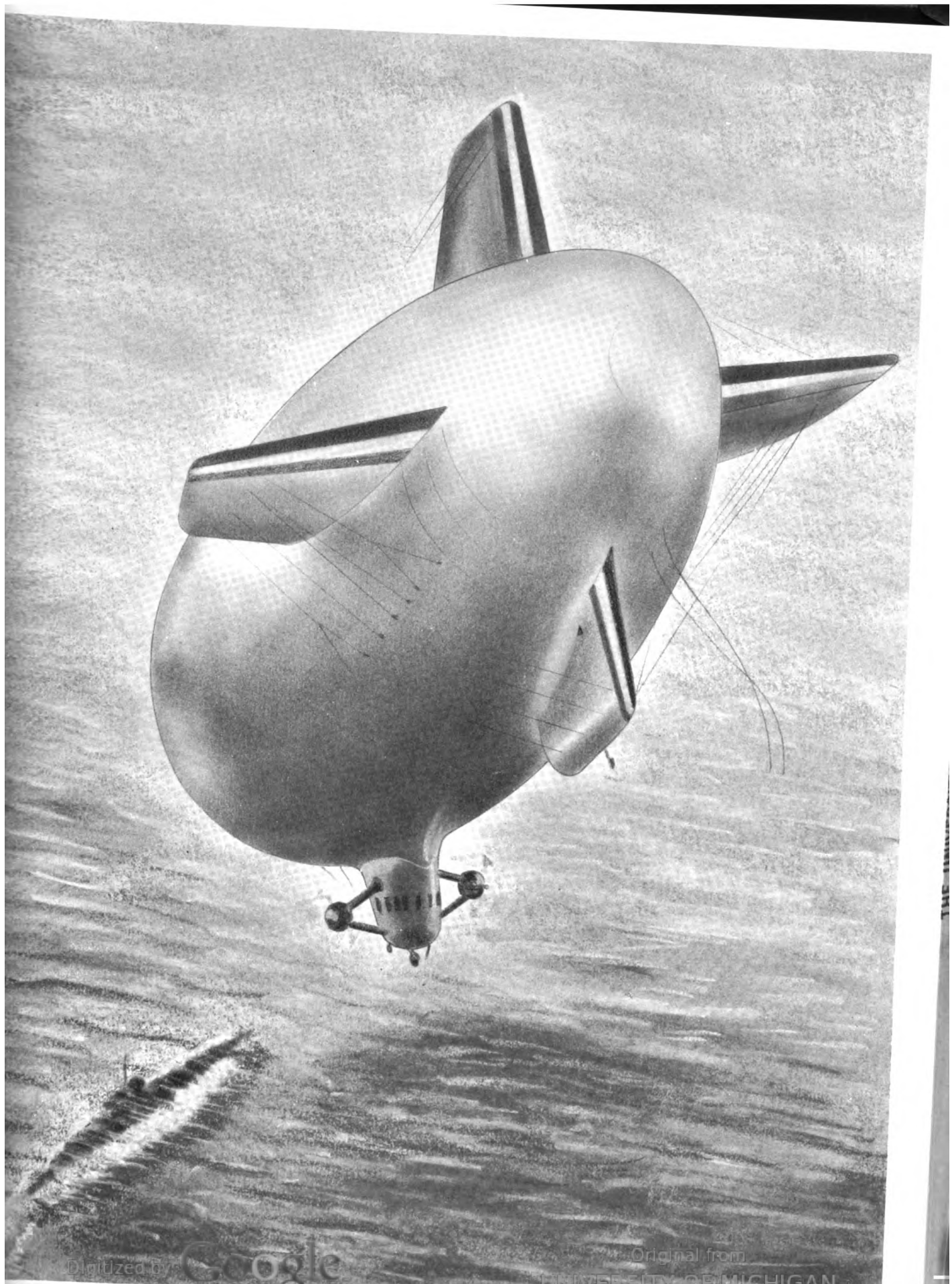
THE NAVY BLIMP has gone to war! Constructed of rubberized fabric, these great lighter-than-air craft are known as the "Watchdogs of the Convoys" and are doing a valuable and ceaseless patrol duty over our sea lanes.

The modern K TYPE Navy *Blimp* is produced by Goodyear, who has had twenty-five years of airship-development experience since the last world war. For its lifting agent it has a capacity for 416,000 cubic feet of helium, a noninflammable gas. Its control cabin has space for radio and navigation departments, a galley, and sleeping quarters; it carries a crew of eight. It has two outboard mounted air-cooled engines that give it a top speed of over 75 m.p.h. and, with a cruising range of over 2000 miles, it can stay aloft for days if necessary.

The *Blimp* is feared by enemy submarines, for it can fly low and slowly enough to spot the telltale shadow of a submerged sea raider even though it is several fathoms deep. Although a *Blimp* is vulnerable to gunfire from a surfaced submarine, it can stay outside the guns' range, and radio the sub's position to aircraft or Navy vessels, which speed to the scene. If the submarine attempts to submerge, its guns are no longer effective, and the *Blimp* can go in for the kill with its explosives. Once it sights the quarry, the *Blimp* can hover motionlessly above to drop its depth charges with devastating accuracy. Immune to poor visibility and low ceilings, the *Blimp* can take off in unfavorable conditions, proceed to its patrol area, and be in position for duty when the weather improves. It can land on the water and anchor there. It can also take on fuel, supplies, and personnel from a moving ship while in flight.

In connection with their regular patrol duties, *Blimps* have saved many lives by speeding to the scenes of sinkings, locating survivors, and dropping supplies.

Congress, early in 1942, realizing the effectiveness of the *Blimp* in patrol work, authorized construction of two hundred of the K TYPE, many of which are now in service.



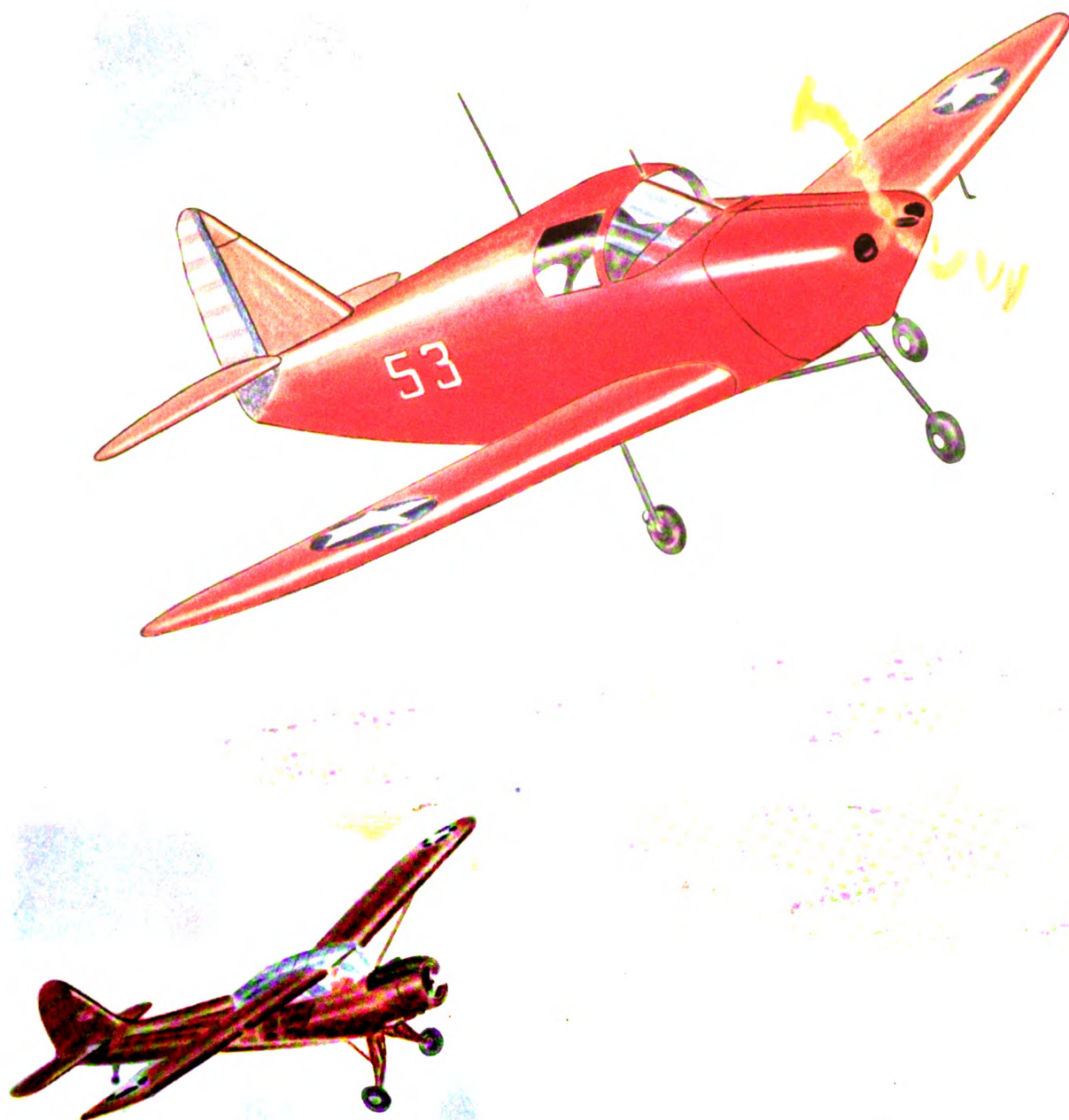
CADET · CULVER PQ-8

THE PQ-8 is a special-purpose plane and information concerning it is restricted.

The commercial version has a mechanically operated retractable landing gear. As it presents very little frontal area and is of clean and compact design, the *Cadet's* 75 h.p. engine gives it a cruising speed of 120 m.p.h. (guaranteed) and a top speed of 140 m.p.h. Climb is 800 feet a minute, and the usable ceiling is 17,500 feet. Maximum cruising range, with twenty gallons of gas, is 480 miles. Gross weight of the plane is 1305 pounds. Because of the elliptical wings, the little *Cadet* looks like the English *Spitfire* from some angles.

The *Cadet* is a low-wing, two-place monoplane and is constructed of plywood. It has a wingspan of only 27 feet, much smaller than the 36-foot span of the light liaison "airial jeeps," and the length is nearly 18 feet. The fuselage is of semi-monocoque construction with a stressed-skin covering of plywood. Wing structure is of the monospar type, the main shear spar being constructed of compressed plywood and spruce. Full cantilever type, each wing is provided with three low drag slots which are in the leading edge near the tip. These slots provide lateral control at low speeds.

The *Cadet* has proved that a small airplane can also embody good flying characteristics. Designed as a private plane, the *Cadet* is easy to handle in acrobatics. It is very economical to operate on cross-country trips because of its high cruising speed and the small amount of power needed for cruising. In case the pilot encounters head winds, or wants to stretch his range, he can cruise the throttle back to 80 m.p.h. and burn only one and one-half gallons of fuel per hour.



CATALINA · CONSOLIDATED PBV

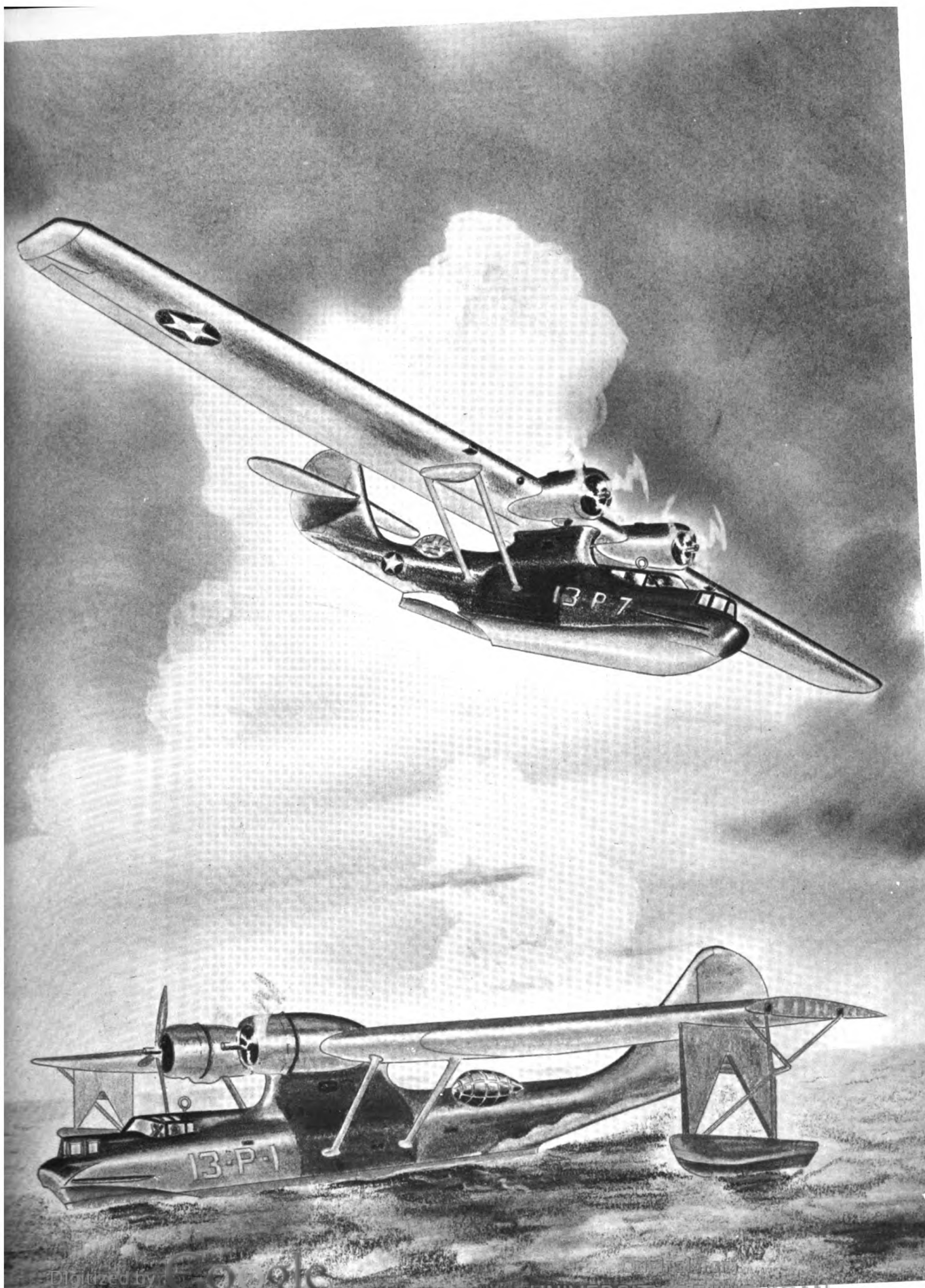
A TIRELESS WORK HORSE for the U. S. Navy and R. A. F. Coast Command, the CONSOLIDATED PBV is a slow, lumbering, long-ranged patrol bomber that has done much toward writing a glorious history for Allied airmen. It has a remarkable record of consistent long-range performance.

It was an R. A. F. *Catalina* PBV-5 that first spotted and trailed the German battleship *Bismarck* in the war's greatest sea hunt, hovering near by until the Royal Navy Sea and Air Forces could come in for the kill. *Catalinas* still continue to patrol German waters, maintaining a constant "death watch" and keeping Nazi vessels bottled up in port. In the battle of Midway they played a deadly role also, reporting Japanese craft locations and guiding land-based bombers to the enemy fleet. In the Aleutians a *Catalina* pilot located the first sign of enemy landings on Kiska and Attu in June, 1942. In the days that followed, the *Catalinas* made many bombing attacks on cruisers, destroyers, and submarines.

Probably the finest plane of its type, the *Catalina* PBV-5 is powered by two Twin Wasp engines, 1050 h.p. each. Top speed is 195 m.p.h.; cruising range is over 4000 miles; landing speed is 68 m.p.h. All-metal, the wingspan is 104 feet; the length is 65 feet. Gross weight is 30,500 pounds. The three battle stations each mount two .50 caliber machine guns.

Wing floats are retracted in flight. The PBV-5A model has a retractable wheel landing gear and is amphibious. Attesting to its versatility, the plane has been used as a dive bomber. *Catalina* pilots dove down through the overcast on Kiska, released their bombs and made a pilot and co-pilot four handed pull-out from the dives to get back into the overcast.

One of the most successful and dependable patrol bombers in service, the *Catalina* has fine facilities for a crew on extended missions.



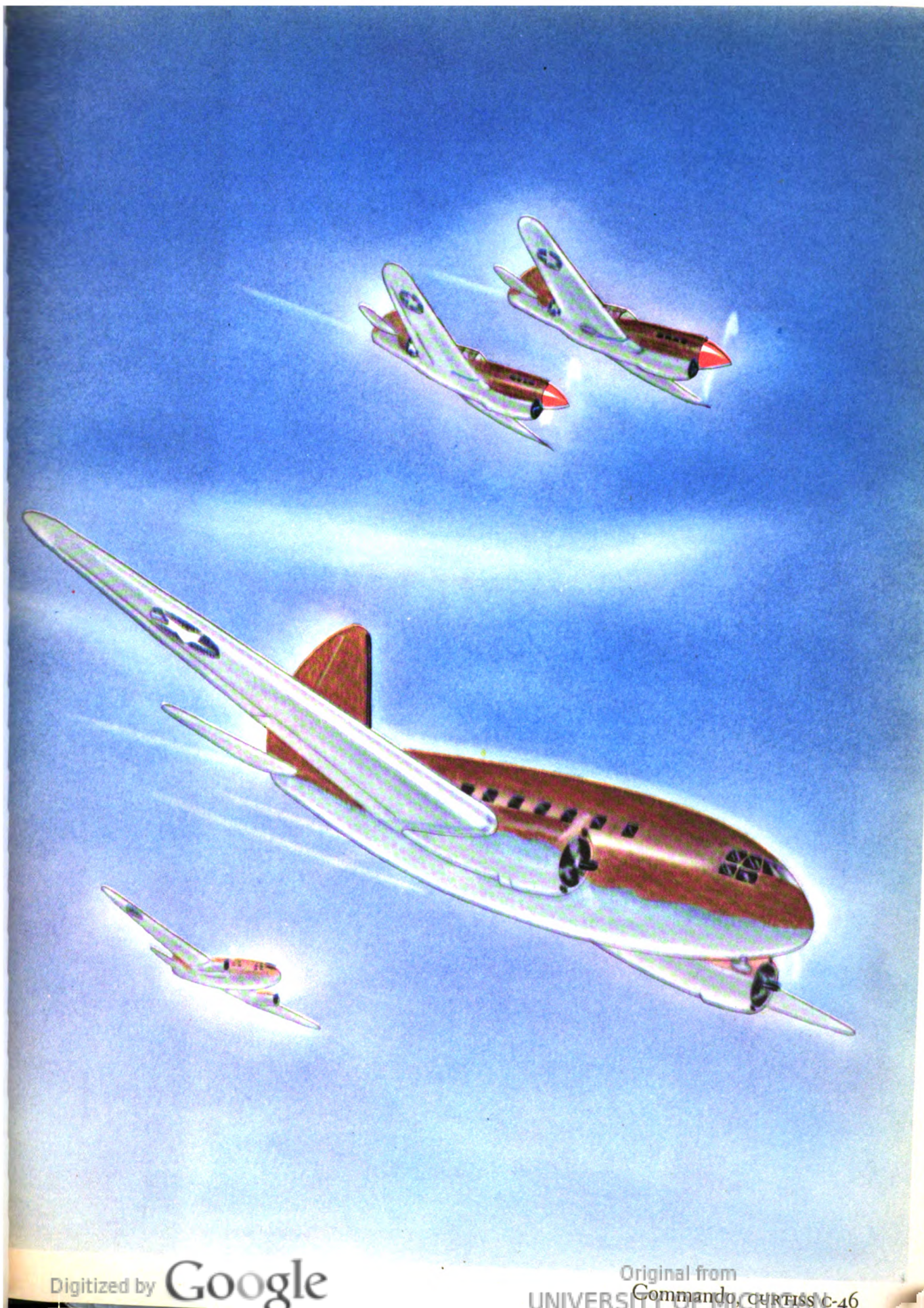
COMMANDO · CURTISS C-46

THE CURTISS C-46 holds the distinction of being the largest twin-engine transport plane in the world and can lift a heavier load than any of our present four-engine bombers.

Now in quantity production, the *Commando* was developed as a thirty-six-passenger luxury liner. Stripped of its luxurious comforts, it has been redesigned as a troopship and cargo carrier and is well adapted for this work. In the battle of supply it is doing many jobs. The *Commandos* fly freight and spare parts and other vital materials to combat planes, carry "brass hats" to England, ferry pilots back from Africa and the sick and wounded from all combat areas. When enough of them have been built they will carry parachutists, air infantry, and jeeps into battle.

Transporting troops and scout cars is only one of the many military missions for which the *Commando* is suited. The framework is built to accommodate the dead weight of artillery, army tractors, trucks, aircraft engines, aviation gasoline, and other supplies required by the modern mechanized army. Very clean in design, the C-46 has a fully retractable landing gear and tail wheel. This aircraft waited long and patiently for acceptance, although in design it anticipated later trends by several years. The engines are supercharged for sub-stratosphere operation so the plane can fly economically at high altitudes.

The torpedo-shaped fuselage interior is pressurized for sub-stratosphere operation. For power the *Commando* has two 2000 h.p. Pratt and Whitney engines. Wingspan is 108 feet, length over 76 feet and height is 22 feet. With a gross weight of 25 tons, the *Commando* has a maximum speed of 254 m.p.h., cruises around 200 m.p.h., has a service ceiling of almost 27,000 feet and a range of 2000 miles.



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Commando, CURTISS C-46

CONSTELLATION · LOCKHEED C-69

THIS NEW SKY GIANT presages a new conception of winged transportation.

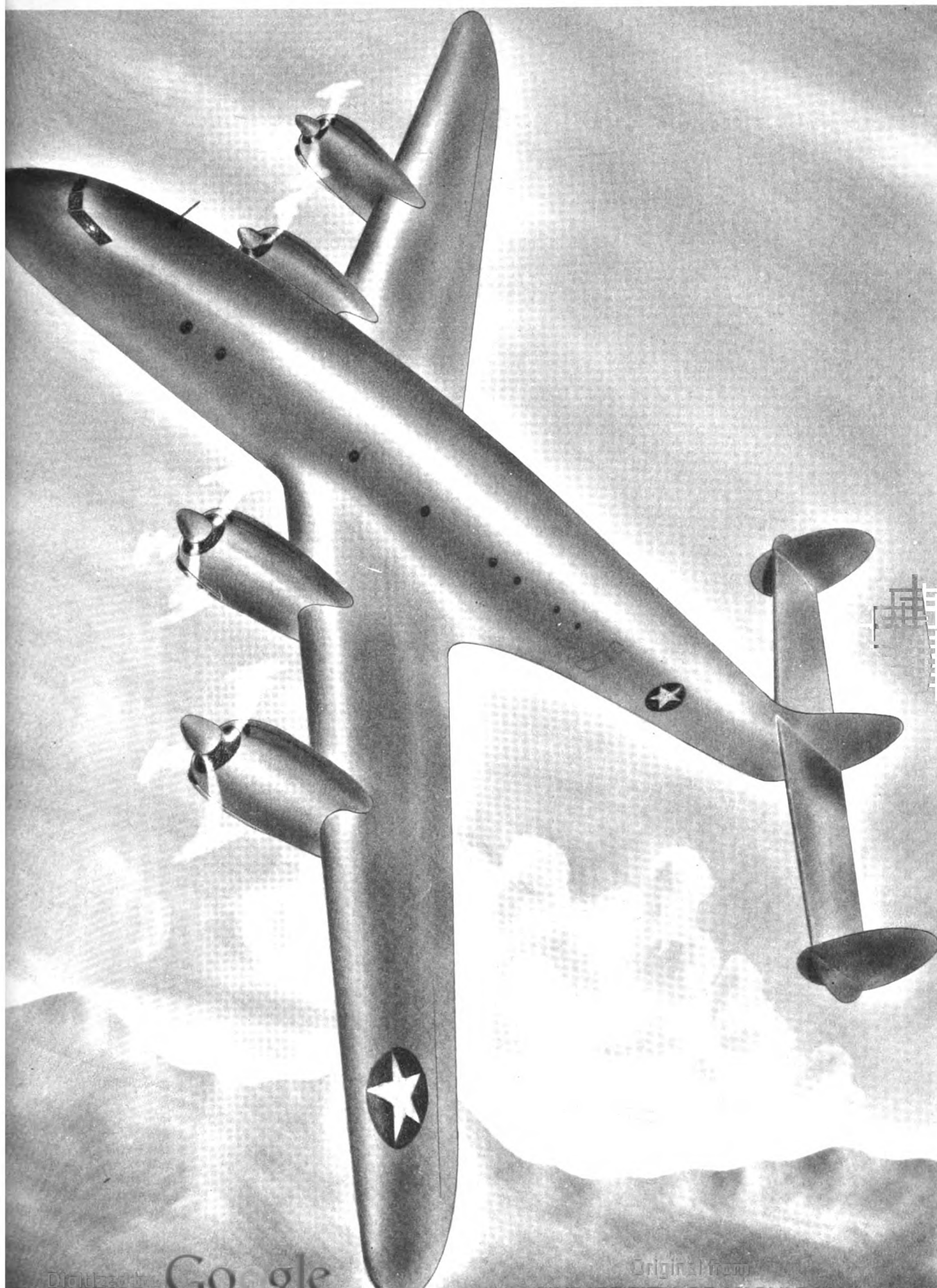
Test-flown on January 10, 1943, the LOCKHEED C-69 is the world's fastest and most powerful land-based cargo and transport plane. Its top speed compares favorably with the cruising speeds of our fighter planes. Faster than a Jap Zero or any four-engined bomber now in service, the *Constellation* will cross the United States in less than nine hours or fly to Honolulu in twelve hours. Its four 2000 h.p. Wright engines give it a cruising speed 100 m.p.h. faster than that of present cargo planes and air liners, and it has a much greater range.

The cabin of the *Constellation* is pressurized to maintain an air density equal to that of 8000 feet while flying at 20,000 feet, and it can be made comfortable as high as 35,000 feet. The ship will fly at 25,000 feet altitude on three engines and will hold at 16,500 feet on only two engines. Its tremendous range will allow it to fly short cuts up over the Arctic to important cities north of the equator.

The *Constellation's* wing is an enlargement of the *Lightning* P-38 wing, embodying high lift with low drag and good flight characteristics. Wing flaps give it a level landing speed of 77 m.p.h. on its tricycle-type landing gear. Engine exhaust is directed through the wing leading edge and thus acts as a hot-air deicer. The arrangement of triple rudder surfaces was designed by LOCKHEED to give a maximum amount of control and safety in the event of engine failure during take-offs or cruising flight.

As a luxury liner of the air, the *Constellation* can be equipped to seat sixty passengers in lazy comfort, with stations for pilot, copilot, flight engineer, navigator, and radio operator as well as service attendants. Cargo space is located beneath the floor and in the nose, partitioned from the passenger compartment by fireproof bulkheads.

The *Constellation* can operate with a full load, using but one gallon of gasoline per mile. No transport of today can approach this economy or compare with its speed, range, and useful load capacity.



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CORONADO · CONSOLIDATED PB2Y

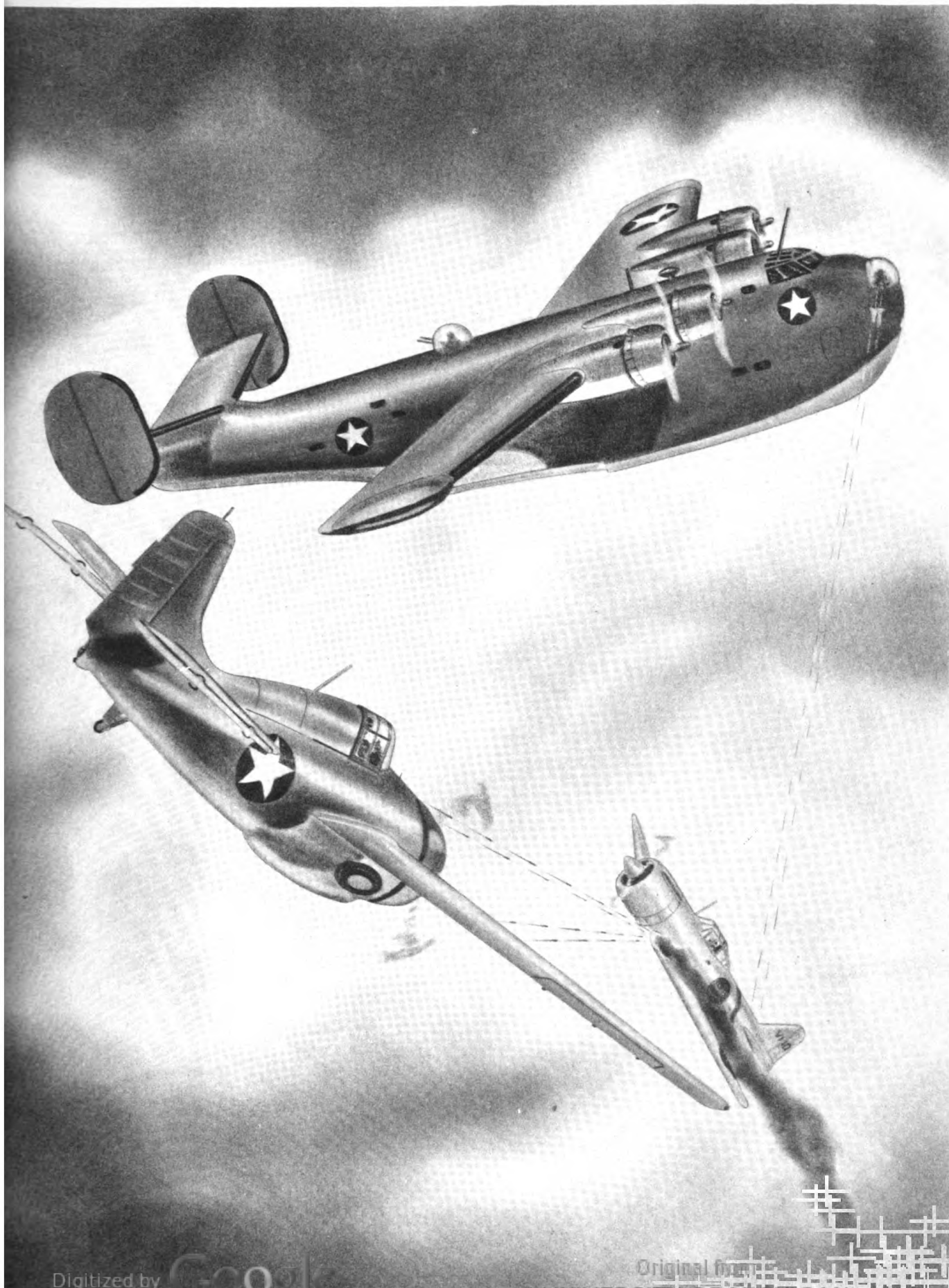
THE CONSOLIDATED PB₂Y-2 is the largest patrol-bomber type in extensive service with the Navy.

Along with other planes of its type, this patrol bomber has been assigned the grueling and monotonous routine of search flights over the vast expanse of ocean, on the constant lookout for enemy activity. This all-important work of patrolling sea lanes of the United Nations goes on ceaselessly, in fair weather and foul, in summer and winter, from far bases in Iceland, Greenland, and Alaska as well as from many bases in the warmer climates. Carrying a sharp-eyed crew and a load of bombs, torpedoes, or depth charges, or a combination of these death-dealing missiles, the PB₂Y's escort our surface ships through seas menaced by enemy submarines.

Powered by four 1200 h.p. Pratt and Whitney engines, the *Coronado* has a top speed of well over 200 m.p.h. and a cruising range of nearly 5000 miles. Capable of carrying a tremendous bomb load, the ship is equipped with a complete galley and sleeping quarters for its crew. All-metal in construction, this giant craft has a wingspan of 115 feet, is 79 feet in length and 25 feet in height, and has a gross weight of more than 30 tons. Each of the three gun-crew stations has power-operated turrets and is equipped with two .50 caliber machine guns in each turret. It has armor protection and also self-sealing fuel cells.

The current model now in production is said to have fixed wing-tip floats instead of the retractable type. It is believed that the new planes of this type are to be used mainly as cargo carriers, since many cargo planes are needed at present for high-speed transit of vital supplies. The seaplane has an advantage in that it can operate in areas where landing fields are not immediately available.

Whether convoying troopships and supplies, patrolling vast reaches of ocean, or bringing her tremendous fighting power to bear on the enemy, the *Coronado* is a magnificent weapon.



CORNELL · FAIRCHILD PT-26

THE FAIRCHILD PT-26 is a new and refined version of the well-known PT-19, so widely used in Air Force training detachments as a primary trainer. The Cornell, however, offers the combined advantages of a primary and basic trainer, as it is equipped for night and instrument flying. It carries landing and navigation lights; parachute flares for night operation; and a full set of blind-flight instruments, including a quickly removable blind-flying hood in the rear cockpit, so the plane can be used for student instrument work. A two-way radio is also installed.

Exterior appearance differs from the PT-19 only in that the Cornell has a sliding hatch covering the cockpits, adding comfort for the pilots, especially in cold weather. An incidental advantage of the hatch is that occupants do not have to wear helmet and goggles, since they are protected from the slip stream. Both cockpits are roomy and visibility is very good in all directions, especially forward, through the use of an in-line engine. The engine cowl has a very definite forward drop from the front cockpit to the nose, aiding the pilot in his constant lookout for other aircraft, which are always numerous in the vicinity of a training school.

The Cornell is powered with a Ranger engine of 200 h.p., an increase of 25 h.p. over the PT-19A. The smooth operation of the in-line Ranger is a definite aid in instruction work. Behind a smooth engine, dual instruction work is far less fatiguing than behind a rough engine, and this is an important feature to instructors.

The Cornell is now being delivered to the Royal Canadian Air Force from its American factory and is also being manufactured under license in Canada. The R. C. A. F. will use it as their standard elementary trainer, replacing other types of planes formerly used.

To most flying instructors this airplane seems as near the ideal trainer, in its class, yet produced.



CORSAIR · VUGHT F4U

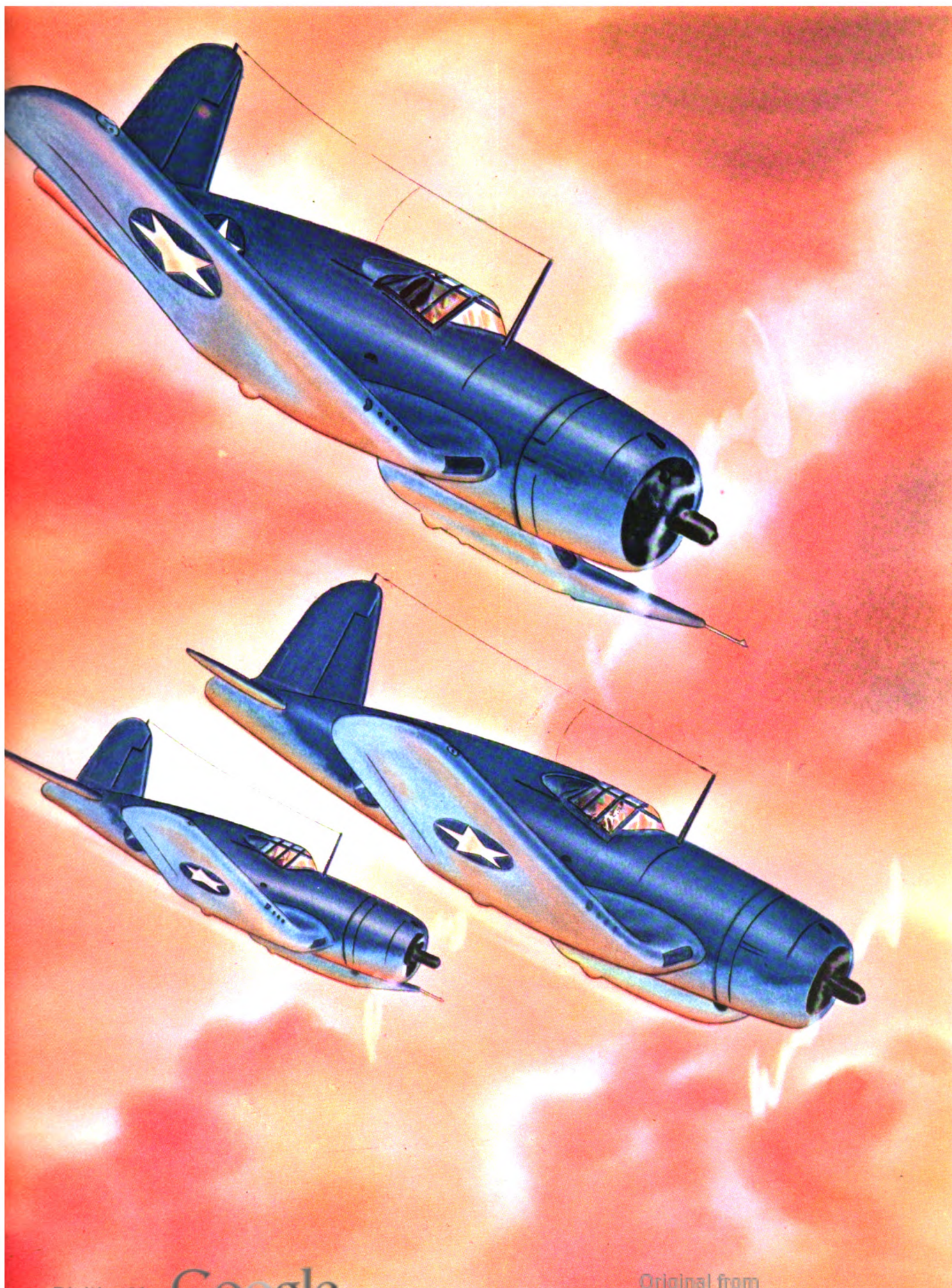
FASTEST SHIPBOARD FIGHTER in the world, the new VOUGHT-SIKORSKY F4U is far superior to earlier types. In comparative tests at San Diago against a captured Jap Zero, it has been reported that the Zero took off a few seconds quicker than the Corsair but that, from then on, the Corsair proved to be far better in combat, in climb, and in speed.

The fuselage is a full-monocoque design, strongly built and spot-welded, and takes all the load without need of internal bracing. The pilot cockpit seat is an innovation, being fitted with a hydraulic shock strut that allows the seat to change angle to a somewhat reclining position, thus relieving some of the strain imposed on the pilot by fast, abrupt pull-outs at high speeds. One test pilot dived the F4U and imposed a load of thirteen times gravity in the pull-out, attesting to the airplane's strength and the practicability of its seat design.

Wings are of monocoque design, single-spar. They are inverted gull-type, so as to give the huge propeller ground clearance with a shorter-legged and stronger landing gear. On the wing leading edge near the fuselage there are large openings to the oil coolers and vents for engine air.

Although the Corsair is a large airplane in every respect, it is said to be unusually maneuverable. It must be remembered that a shipboard fighter is not designed for speed alone. It must carry flotation gear, deck-landing and arresting hook gear; it must have folding wings for stowage under the carrier deck; and, for all this added weight, it must have sufficient wing-spread and flap area to insure slow landing speed for flight decks. Wing-span is about 40 feet and length approximately 30 feet. Gross weight is nearly 9000 pounds.

Powered by a Pratt and Whitney double Wasp engine of 2000 h.p., the top speed is reported to be 400 m.p.h. Superchargers give the engine 1600 h.p. at 20,000 feet; so this new fighter can fight well at all levels. Usable ceiling is much higher. Armament probably consists of six or more .50 caliber machine guns, wing-mounted, and a bombload of 300 to 500 pounds. No Axis aircraft even approaches the Corsair in combat value.



CURTISS AT-9

SPECIALLY DESIGNED for the training of potential pilots for fast twin-engine fighters and bombers, the CURTISS AT-9, unorthodox in appearance, is one of the transitional types that fill the gap between single- and twin-engine operation. Many Army cadets get their first taste of multiengine training on this two- to four-place airplane, which has been produced in quantity.

A full set of flight instruments and radio equipment is installed and the plane is also equipped with landing lights, navigation lights, and flares, for night operation. Cockpit instrument placement and complexity are ample to simulate the characteristics of larger multiengined craft. The Curtiss Telltale panel mounted on the instrument panel is of special interest. It has all gadgets listed—landing gear, flaps, etc.—and, if any of the control mechanism is not in its proper position for the flight attitude, a warning light appears, opposite that control listing, indicating any improper operation. The telltale panel thus eliminates pilot error in cockpit procedure.

The hardest part of flying larger aircraft, with their array of instruments and gadgets, is the learning of cockpit procedure, including, of course, use of electric-controlled flaps, retractable landing gear, and propeller control. Once this is absorbed the actual flying of the craft is simple, and the AT-9 is much easier to fly than is a primary trainer. Control movement is positive under all conditions and requires very little effort.

Powered by two 280 h.p. Lycoming engines, the AT-9 is very smooth in operation—as are all Lycoming-powered planes—but is unable to fly efficiently much higher than 12,000 feet because the engines are not supercharged. All-metal in construction, the CURTISS AT-9 has a top speed of over 180 m.p.h.; it cruises at nearly 160 m.p.h. and lands, with full flaps, around 80 m.p.h.



DAUNTLESS · DOUGLAS SBD

THE JAPS know and have learned to fear the DOUGLAS SBD *Dauntless* dive bomber. In screaming plunges from 20,000 feet, these tough, heavily armed, two-place carrier-based planes have ripped and torn the Nipponese fleet in the Pacific. Flown by Navy and Marine Corps pilots, land- or carrier-based, the SBD's have dealt heavy, blasting, knockout punches wherever the U. S. Navy fighting forces are in action, and have also been making scout-bomber patrol missions vital to fleet warfare.

Within a few short weeks after Pearl Harbor the DOUGLAS SBD went into action with the Navy in its first offensive thrust against the Japanese. In a telling raid by air and surface craft against the Marshall and Gilbert islands, it was the *Dauntless* which helped to record the first real offensive from aircraft carriers by the United States Navy. In the Coral Sea battle, *Dauntless* dive bombers, along with *Devastators*, sank Jap ships and destroyed many Zeros.

Powered by a 1000 h.p. Wright engine, the *Dauntless* is one of the best airplanes in its class. Top speed is well over 250 m.p.h.; cruising speed over 200 m.p.h.; ceiling is 24,000 feet and range is about 1000 miles. The plane's wingspan is $41 \frac{2}{3}$ feet; its length is $31 \frac{2}{3}$ feet. The *Dauntless* can carry 1000 pounds of bombs, usually one 500 pound bomb under the fuselage, and others along the underside of each wing.

Scout bombers may be employed on either scouting or attack missions. For scouting missions additional gasoline is carried instead of a bomb load, thus extending greatly the radius of the plane's action. In this operational role the scout bomber possesses no offensive power other than its fixed forward-firing machine guns and those mounted in the rear cockpit. Its job, then, would be to secure information about the enemy or his positions.

The Army version is the A-24.



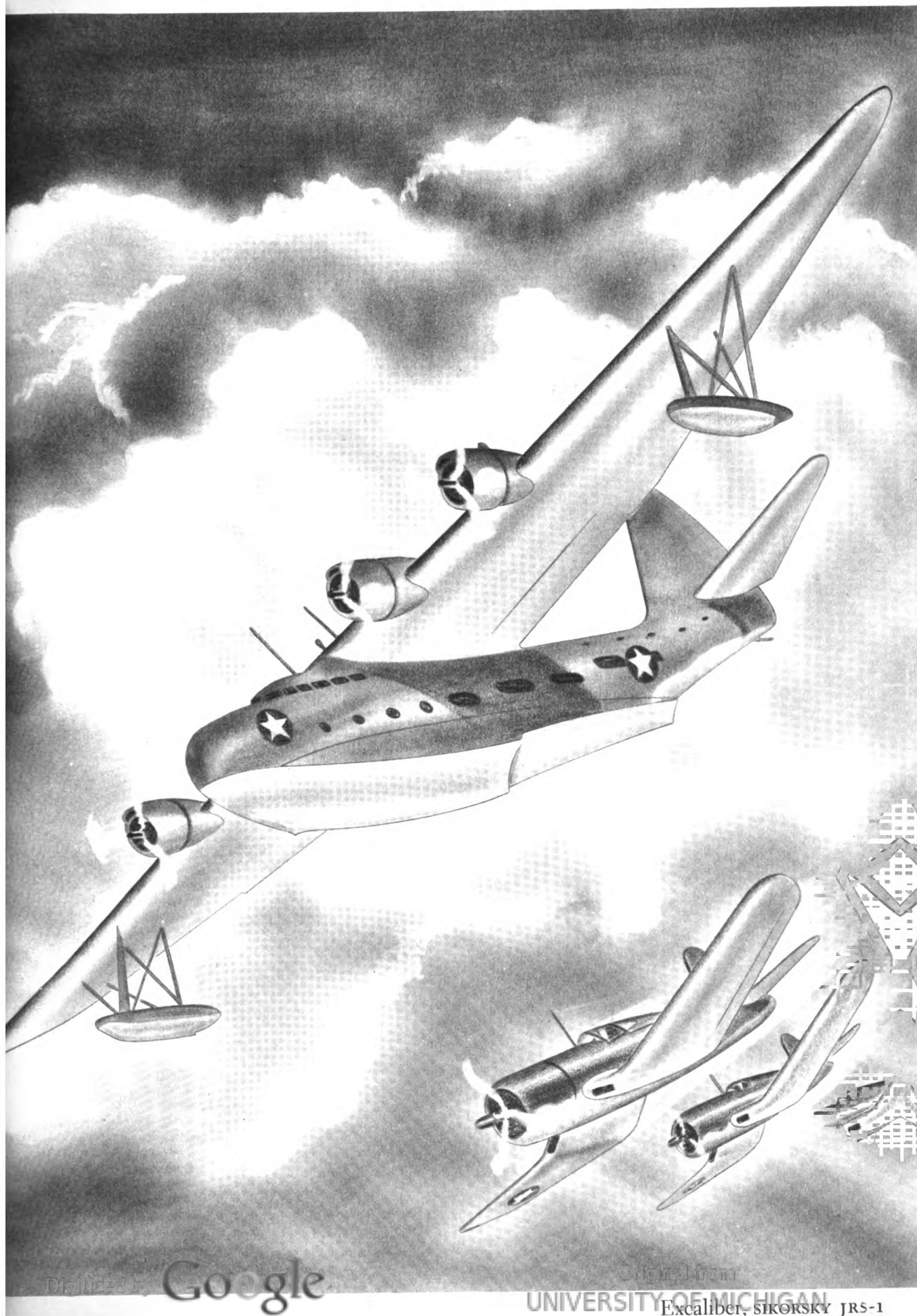
EXCALIBUR·VOUGHT-SIKORSKY JRS-1

THE VOUGHT-SIKORSKY JRS-1 is a long-range, heavy-load-carrying Navy freighter originally designed as a patrol bomber. This flying boat is one of the most powerful in its class, having a load capacity comparable with that of any other existing airplane. It can carry a large cargo for 3000 miles nonstop, and its extreme range, under special fuel and load conditions, is more than 6000 miles.

The *Excalibur* is a four-engine all-metal, high-wing, full-cantilever monoplane flying boat. It is powered by four Pratt and Whitney Twin Wasp engines of 1200 h.p. each and is equipped with three-bladed constant-speed propellers. Every important part of the airplane has been static-tested to destruction, and its designers have built into it safety factors far in excess of requirements. The ship is of all-metal construction except for fireproof fabric on the trailing-edge wing, the wing flaps, and all the movable control surfaces. Six watertight bulkheads divide the interior into sections, permitting isolation of any of the compartments in case of damage to the hull's underside. The trailing-edge wing flaps are full in that they extend from the hull to the ailerons and aid, when depressed, in shorter take-offs and slower landings.

The plane is soundproofed throughout and equipped with living accommodations for the crew—a mechanics' workshop, a galley with electric stove, a water distiller, and a dry-ice refrigerator. With such equipment, sustained operation is possible and the endurance and efficiency of the crew are increased. A 110-volt electric system is installed, which generates power for the electrical units, flaps, anchor winch, radio, lighting system, and appliances in the galley. An auxiliary gasoline engine drives the generator, supplying the electric current. A telephone system connects with all points of the interior.

Although it often does not get the publicity of combat craft, the unsung cargo plane has an important part in the war, flying thousands of miles each day in the vital service of delivering important war materials to all parts of the globe.



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Exc caliber, SIKORSKY JRS-1

FAIRCHILD PT-19

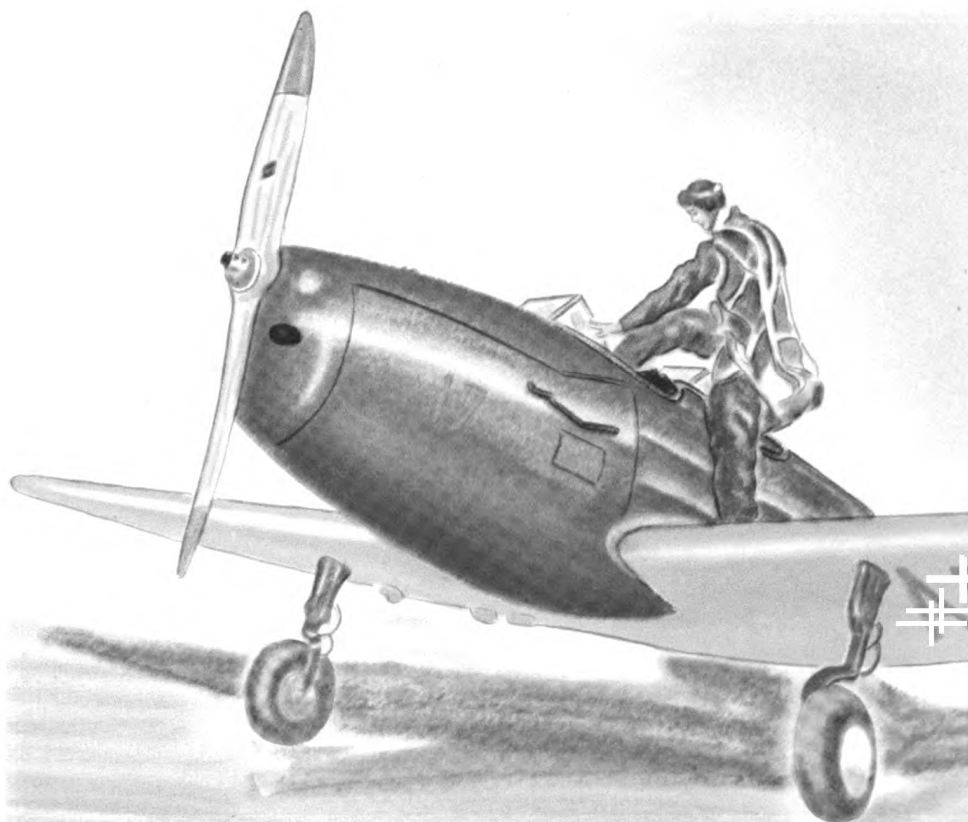
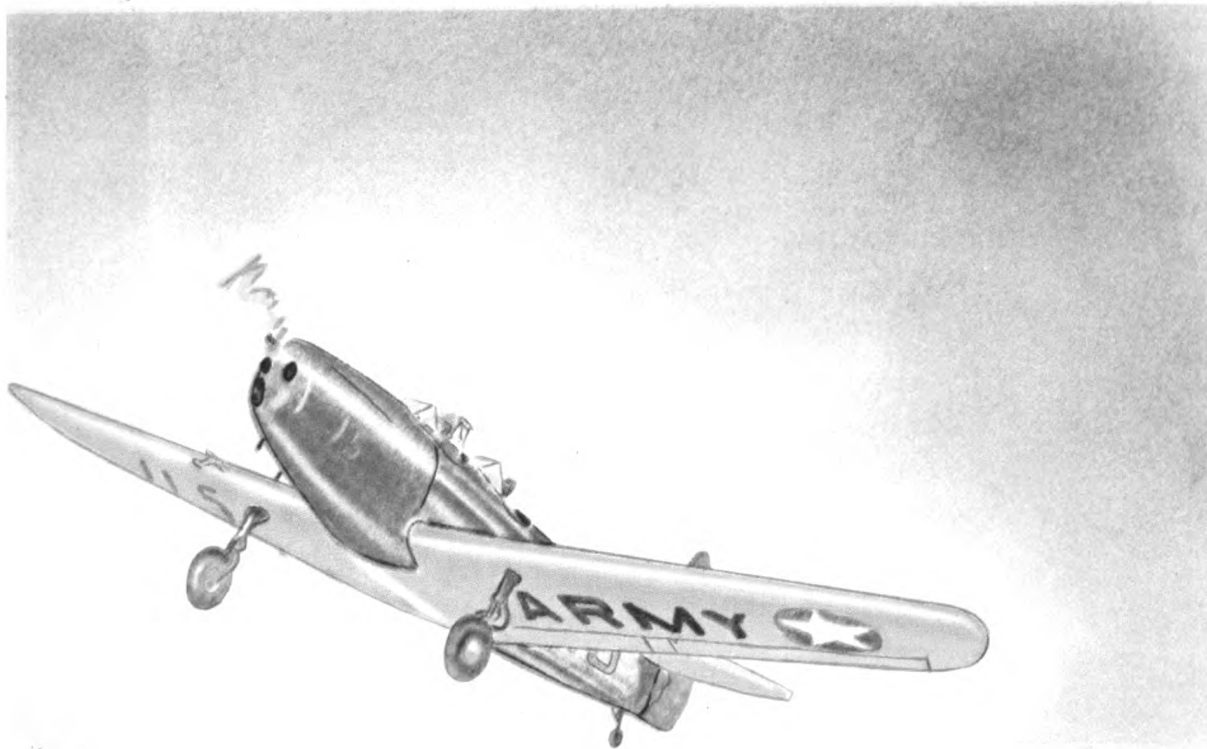
MOST USED of all military primary trainers is the Army PT-19. One of the first low-wing trainers to be approved by the Army, the PT-19 is said to have the same flying and stalling characteristics as a biplane.

This two-seat training monoplane was strongly constructed, to take the stresses imposed by the acrobatics of a beginner, and has held up well under the abuse of the heavy-handed student. Control-pressure response in precision acrobatics is good and an experienced pilot or apt student can fly the PT-19 through the book. The PT-19 has the distinction of being the first primary trainer of full cantilever construction to be approved by the Army. Wing construction consists of center section and two outer panels, built up of wood box spars, wood ribs, and plywood covering. Fuselage is of welded steel tubing and wood fairing; it is fabric-covered except for the top, which is metal-covered. The fixed tail surfaces are of wood, plywood-covered, and the movable surfaces are of steel and aluminum, fabric-covered. Wingspan is 36 feet, length is nearly 28 feet, and height is 7½ feet.

Power is supplied by an inverted air-cooled and in-line Ranger engine of 175 h.p. Level top speed is 135 m.p.h.; cruising speed is 120 m.p.h.; landing speed, with flaps, is 55 m.p.h. Climb, at sea level, is 835 feet per minute; usable ceiling is 16,000 feet; range, with 45 gallons of fuel, is 480 miles. Gross weight is 2450 pounds.

The PT-19 has received an Approved Type Certificate from the Civil Aeronautics Authority and is being used in training the advanced civilian-pilot trainees who are later to go into the armed forces.

Equipped with a Continental radial engine of 220 h.p., this FAIRCHILD plane is going into quantity production as the PT-23 and is being built, under license, by AERONCA, in Ohio.



FAIRCHILD AT-13, AT-14

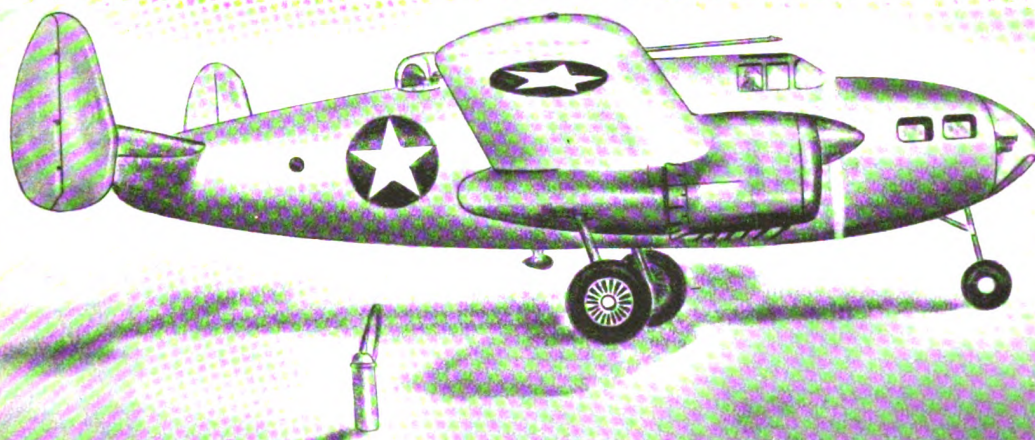
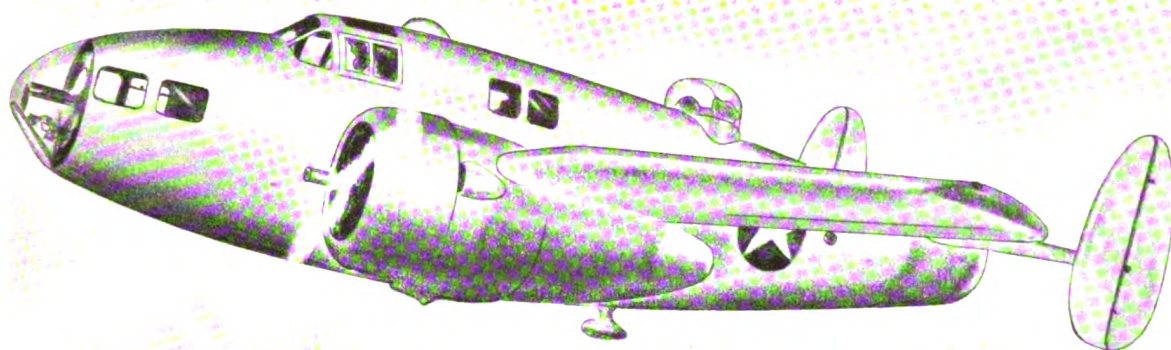
BUILT ALMOST ENTIRELY of Duramold, a plastic bonded plywood, these new crew trainers look a lot like the famed *LOCKHEED Hudson*. The AT-13 (bottom) and the AT-14 (in air) differ mainly in engines.

These advanced trainers were built to meet the necessity of training bombing crews as units. Each provides places for a bombardier in the transparent plastic nose, a pilot and a copilot in the cockpit, a navigator-radioman beneath the special navigation hatch just aft of the cockpit, a machine gunner in the power-driven gun turret, and a cameraman over the vertical and angular camera hatches in the tail. It also carries ten 100 pound practice bombs. The ship has all the equipment necessary for an entire training crew to simulate a long-range bomber attack.

The first trainers of their type to be equipped with tricycle landing gear, they are very similar to tactical planes and will enable crews trained on them to step into actual fighting craft as well-coordinated teams.

The AT-13 is powered by two 550 h.p. Pratt and Whitney radial engines, and the newer AT-14's power is supplied by two Ranger inverted 12 cylinder V-type air-cooled engines rated at 520 h.p. for take-off and 450 h.p. at 12,000 feet. They each have a wingspread of 52 feet, 6 inches, are 38 feet in length, and stand slightly over 13 feet in height. The use of Duramold in construction gives the plane a perfectly smooth exterior finish, so it is efficient aerodynamically. Speed is well over 200 m.p.h., but exact figures are not released by the War Department.

The FAIRCHILD AT-13 is said to be one of the largest and fastest planes designed for training. The AT-14, although of slightly less horsepower than the AT-13, is probably the faster of the two in that the in-line Ranger engine presents less frontal area to the wind and thus has less drag than the radial engines on the AT-13.



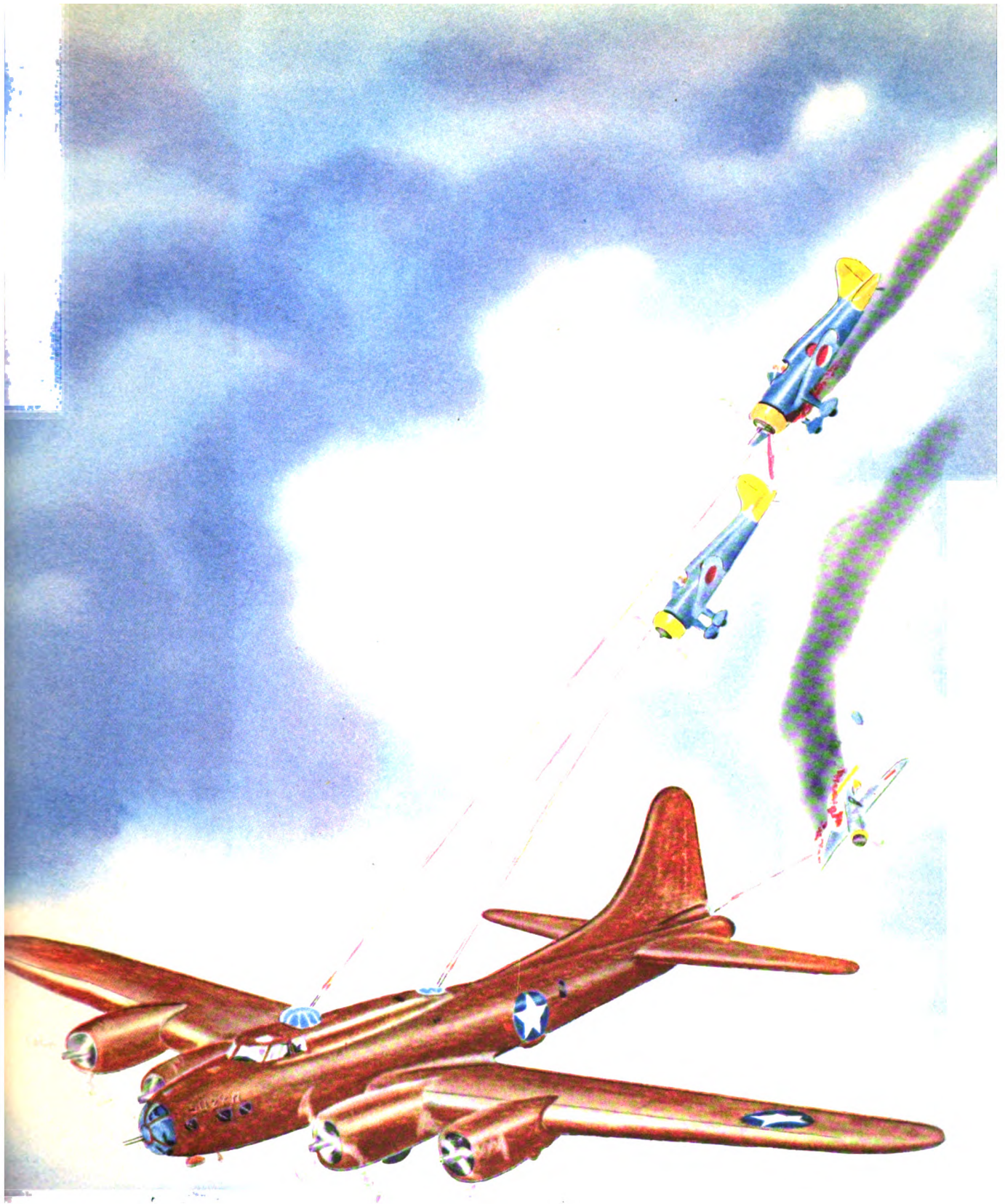
FLYING FORTRESS · BOEING B-17

MOST FAMOUS of all U. S. bombardment aircraft is the BOEING B-17 *Flying Fortress*. The engines are fitted with turbo-superchargers which make it possible for these ships to carry the air war to the high-altitude limits of human endurance. In the smooth air of the upper regions the B-17 becomes a stable bombing platform for the functioning of our very effective Norden bombsight. Since Pearl Harbor the "Forts" have played major roles on every front. They have bombed the Japanese on land and sea, shot Zeros down like clay pigeons, and blasted the Nazis and Italians.

Enemy planes attack the fighter protection rather than get within range of the fire power of a *Fortress*' thirteen or more guns. Concentrated fire from several B-17's is terrific. First to make successful daylight bombing raids over Nazi-held countries, *Fortress* squadrons surprised the English as well as the enemy and set up an enviable record. In raid after raid, gunners blasted German pilots with their .50 caliber machine guns. Thirteen consecutive daylight raids were made against Nazi war-production points without the loss of a single plane. *Fortress* gunners have set up a staggering box score of victories over Nazi fighting planes. Of eighty German planes shot down in October, 1942, seventy were credited to *Fortress* gunners.

The early-model *Fortress* did not have a tail-gun turret; so when the "Forts" went out over Jap territory equipped with the twin-gun stinger, many Zeros, prepared for "pot shots," were shot down by the withering fire of the two .50 caliber machine guns.

Flying Fortresses are undergoing constant improvement, and data on the newest B-17E and F are withheld; but the early models had a wing-span of 104 feet, a length of 68 feet, and a height of 15½ feet. With 1700 gallons of gas and 180 gallons of oil, the gross weight was 45,470 pounds. Late B-17's are powered with four Wright Cyclone engines of 1200 h.p. or more. Top speed is over 300 m.p.h., service ceiling is over 36,000 feet, and range is 3000 miles with 3½ tons of bombs. The *Flying Fortress* will go down in history as one of the best offensive aircraft of World War II.



FORWARDER · FAIRCHILD C-61

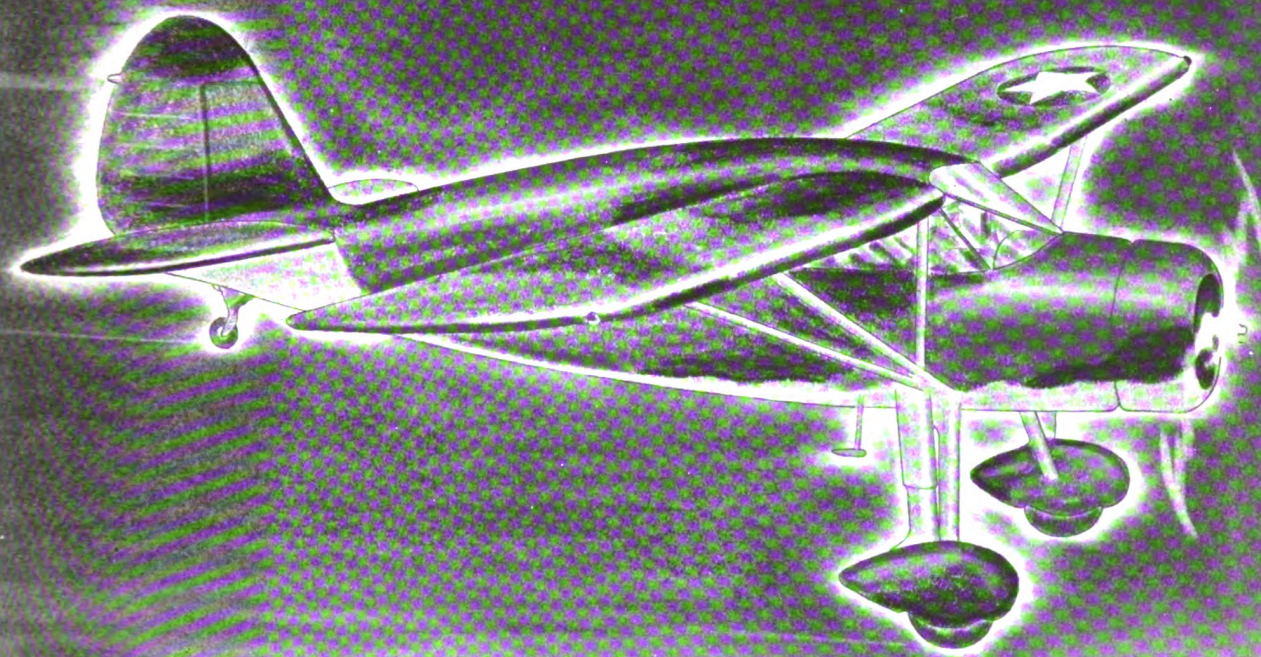
LONG A FAVORITE among civilian pilots and famous for its superb flight characteristics, the FAIRCHILD C-61 is now doing important yeoman duty in the war effort, both here and abroad.

A four-place cabin plane, it is compact but roomy and comfortable, with ample baggage space provided. Powered by a Warner engine of 175 h.p., available for take-off, it is very economical to operate. Fuselage is constructed of welded steel tubing, fabric-covered. Wings have spruce spars and spruce ribs, fabric-covered. Wing flaps are standard equipment. The landing gear is wide, for ease of handling on the ground, and the gear is of rugged construction.

The only plane of its class to have a stick control instead of a wheel, the C-61 has very light control movement because ball bearings are employed throughout. Gross weight is 2550 pounds. Top speed is 140 m.p.h.; cruising speed is 120 m.p.h. Landing speed is 48 m.p.h. with flaps and 52 without flaps. Climbing speed, at sea level, is 800 feet per minute. Usable ceiling is 16,000 feet and maximum range, with 60 gallons of gasoline, is 720 miles. A full complement of flight instruments and a two-way radio are installed, and equipment includes an electric engine starter.

Used by the U. S. Army Air Force as a utility craft, the FAIRCHILD is also doing pilot ferrying and liaison work for England.

Because of its ease of handling and its ability to get into and out of small landing areas, combined with its ruggedly constructed dependability, its safety, and its economy, this FAIRCHILD cabin plane has made a name for itself through years of proved performance. A FAIRCHILD "cabin" can be found in use at almost every airport in the United States, and it has also been bought by operators and private pilots all over the world.



FLEETWINGS BT-12

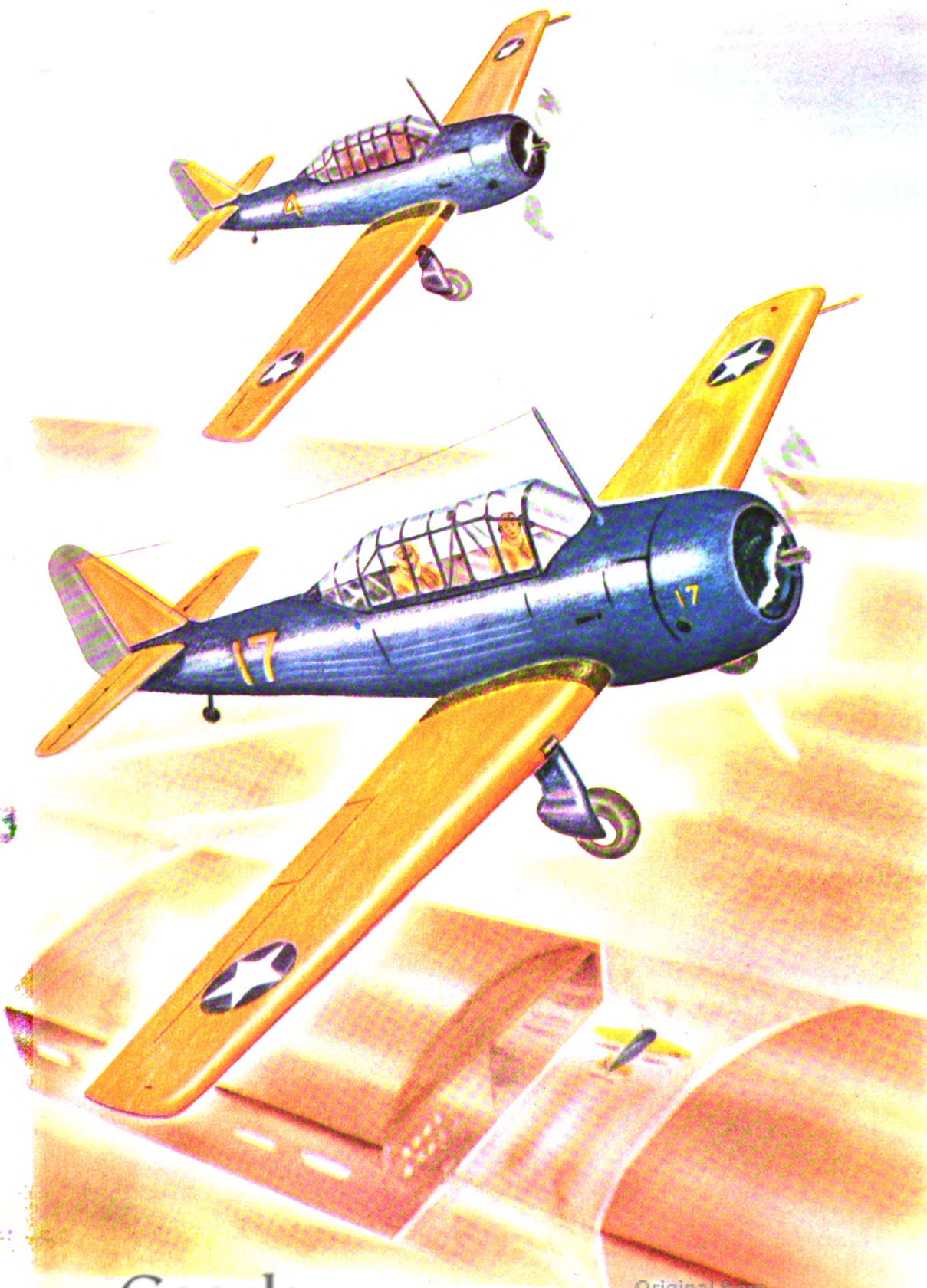
A BASIC TRAINER built principally of stainless steel, spot-welded, the FLEETWINGS BT-12 is the first military aircraft to be so constructed. With a premium on aircraft metal alloys, the use of steel releases somewhat lighter metals for combat-aircraft production. The use of spot welding not only gives a smooth finish and a rugged construction to the airplane but also saves production time.

Maneuverable and airworthy, the BT-12 is used for acrobatics and for cross-country and formation flying; it has been designed to provide excellent visibility for both instructor and student pilot. The fuselage is a built-up tubular framework with monocoque top and bottom aft of the cockpit. The wing center section is 35 per cent steel-covered and the balance is fabric covering over steel ribs. The cantilever landing gear is fixed and streamlined.

Powered by a Pratt and Whitney Wasp Jr. engine of 450 h.p. at sea level, the BT-12 has a top speed of about 190 m.p.h. and a service ceiling of 23,800 feet. Landing speed is 58 m.p.h.; wingspan is 40 feet; it is 29 feet long and nearly 12 feet in height.

In addition to a full complement of instruments necessary, basic trainers are all equipped with a constant speed or variable pitch propeller. The propeller pitch can be changed in flight and acts much like the gear shift principle of an automobile in that the prop is set at a low pitch for take-off and climb, and with higher pitch for cruising.

Although much larger, heavier, faster, and with much more horsepower than a primary trainer, this basic trainer is usually easier to fly than is the primary type. With it the U. S. Army is turning fledgling "dodos" into fighting birdmen.



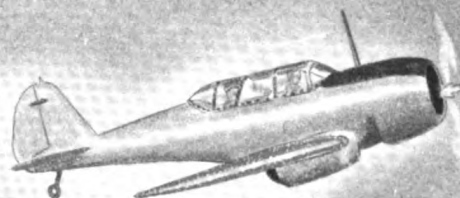
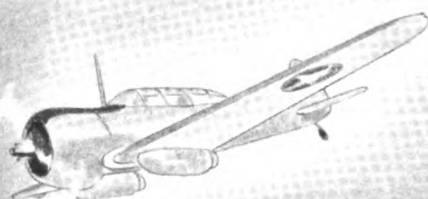
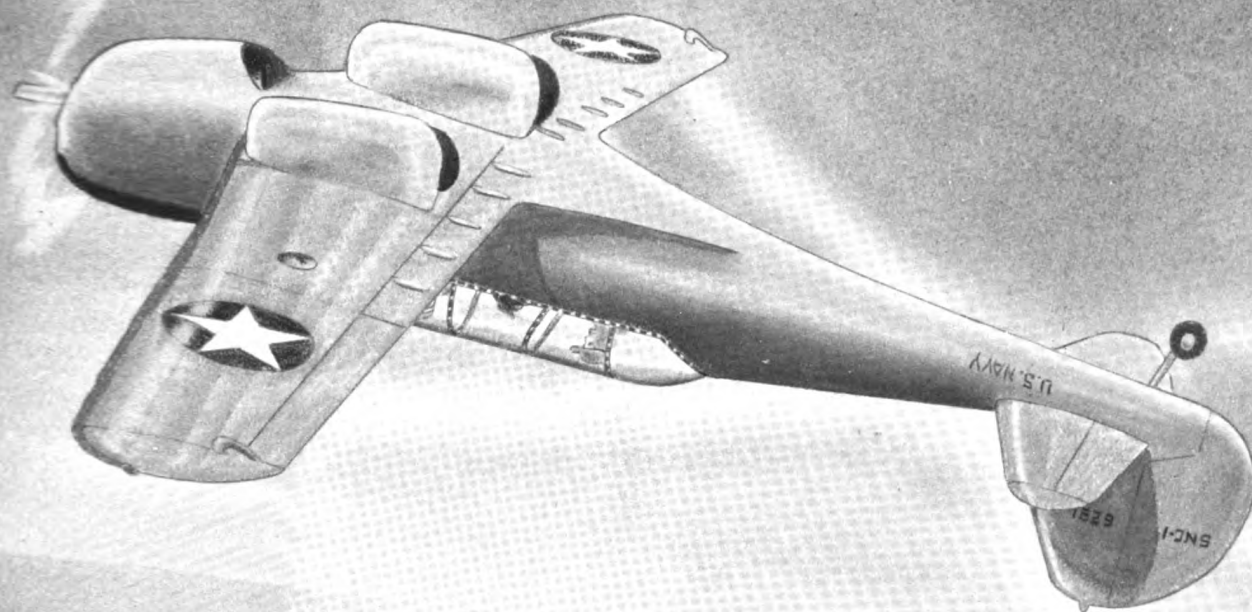
FALCON · CURTISS SNC-1

THIS TWO-PLACE advanced combat trainer is very much like a fighter in appearance and is used in quantity by the Navy. Small and compact, the *Falcon* is agile and is very good in acrobatic flying. It has a steep-climb angle and a very good rate of climb. Used by combat pilots prior to their transfer to Navy fighters, the *Falcon* mounts machine guns and can be employed as a defensive weapon if necessary. Adaptable for instrument flying, it can also be equipped for work at high altitudes.

The *Falcon* is an all-metal plane; the fuselage is of semi-monocoque design, having a series of bulkheads and longitudinal stringers to which a stressed skin is riveted. The wing is a full-cantilever type, constructed throughout of aluminum alloy and built up of stiffeners, shear spars, and fore and aft bulkheads. Wing covering is stressed Alclad skin, which is riveted to the bulkheads, stiffeners, and spars. Aluminum-alloy-covered split-type flaps are placed on the wing trailing edge and are mechanically operated.

The *Falcon* SNC-1 is powered by a 450 h.p. Wright Whirlwind engine; it has a top speed of over 225 m.p.h., a cruising speed of around 200 m.p.h., and a landing speed of 60 m.p.h. Its climb rate is several thousand feet a minute and it has a service ceiling of 26,000 feet. Cruising range is over 500 miles, carrying 131 gallons of fuel. Gross weight is 3200 pounds.

It is interesting to note the advancement of aircraft through the years. A first-line single-seat pursuit biplane built by Curtiss ten years ago had a top speed of nearly 200 m.p.h. and needed 600 h.p., or more, to attain this speed! Now Curtiss builds a two-seat trainer that can outspeed the pursuit plane of ten years back and could be made into a formidable fighter with only a few changes.



GLIDERS

THE UNITED STATES is hard at work on the perfecting of *gliders* and determining their possibilities. At Air Force schools all over the country, fliers are learning the specialized job of *glider* piloting.

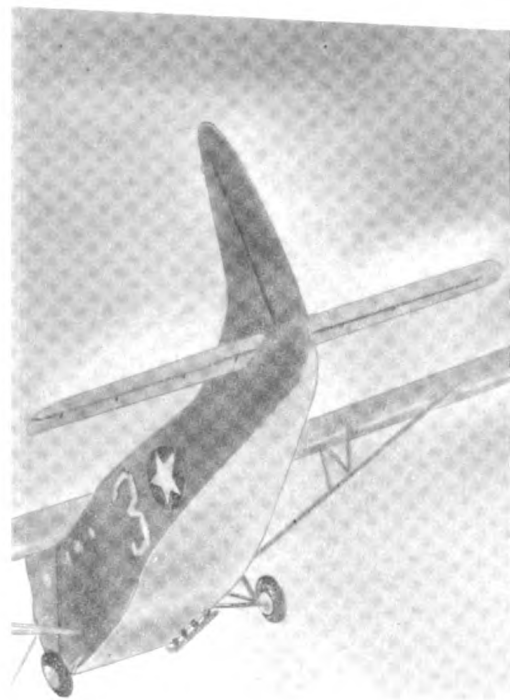
At Wright Field big transport *gliders* are under test. At Wichita, Kansas, the BOEING, BEECHCRAFT, and CESSNA plants have pooled sections of their training-plane departments to build fifteen-place *gliders*. The FORD plant is building them, too. In North Carolina regiments of air infantry are being groomed for combat, while in Indiana flying officers of the new Troop Carrier Command are perfecting towing techniques.

Large numbers of three-place training *gliders* have been built by the simple process of converting light planes. The AERONCA, PIPER and TAYLORCRAFT planes, by taking the engine off the nose and extending the cabin out forward, have supplied the Services with all of this type needed. The instructor's weight in the nose compensates for the engine's removal and thus balances the craft. These planes are designated TC (training glider), and each type has a different number assigned. The AERONCA, for instance, is the TC-5.

In actual combat operations paratroops would precede the *gliders*, dropping behind enemy lines. As the shock troops of the attack, they will block roads, cut communications, and seize airports or landing areas. Then in will come the *gliders*, by the hundreds, to every empty field, spilling out infantry squads until regiments and even divisions are landed and in action. The transport planes will fly in food and ammunition, artillery, and even light tanks, while fighter planes protect them from above.

Gliders can be towed to high levels at night, close to enemy lines, and released to continue to their objective silently, timing their arrival to be in landing position just at dawn. A large *glider* can carry an infantry component with full equipment. It is especially valuable for landing signal equipment, medical supplies, ammunition, and other supplies.

The use of *gliders* presupposes local air superiority, because the planes are vulnerable in daytime without protection from above.



GRASSHOPPERS

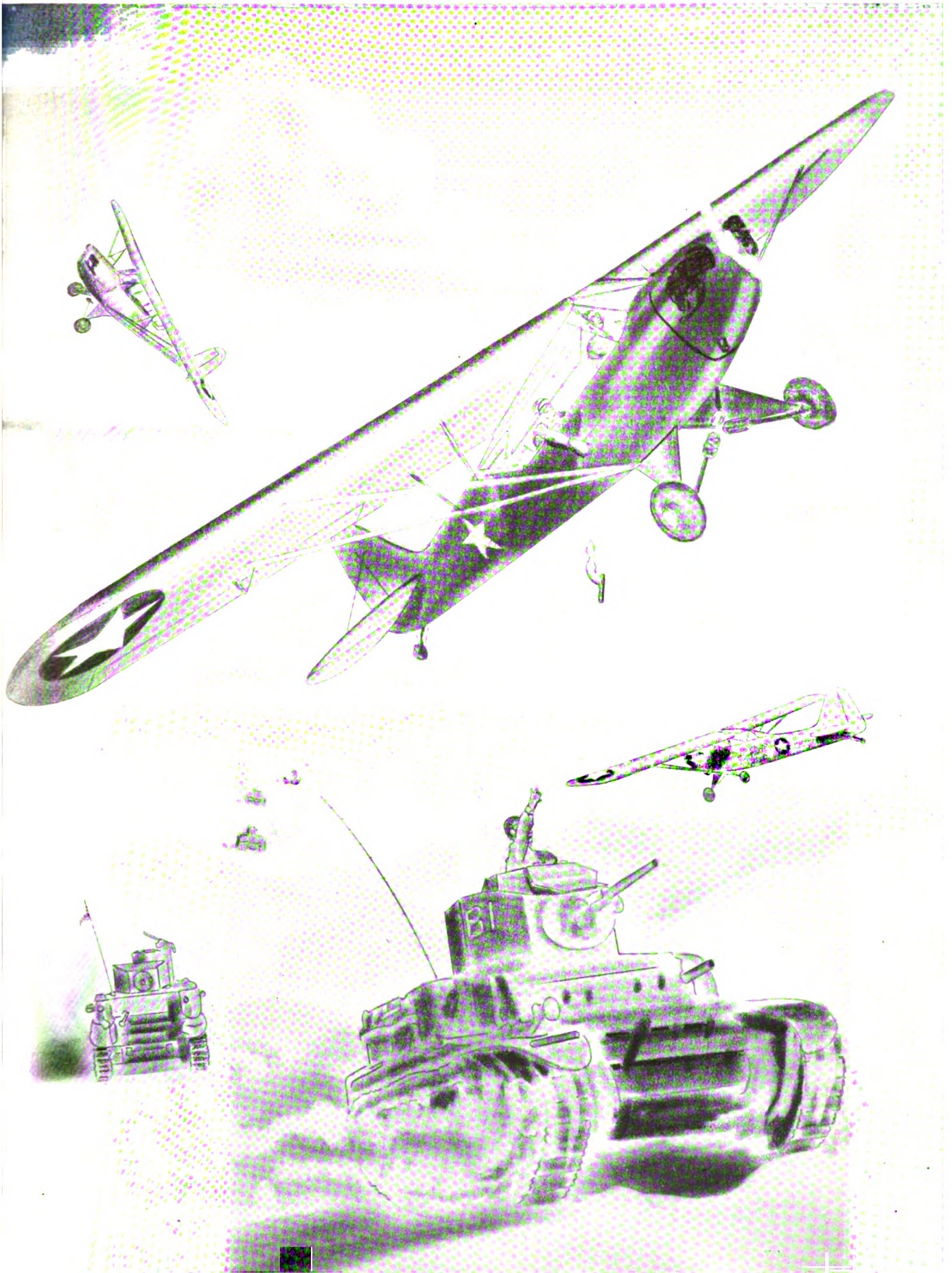
EVEN THE light plane has gone to war. These small planes now follow their civilian pilots into uniform. They have proved their worth under grueling field tests and in the face of considerable skepticism.

The War Production Board has now ordered manufacturers to deliver all planes with less than 500 h.p. for use only by the Government, by our Allies, or by civilian organizations engaged definitely in war work. There is a strong feeling that the "Aerial Jeeps" should be flown by non-Air Force pilots, because Air Force pilots are more at home in heavier ships and because their very costly special training is not necessary for light-plane operation. Light-plane pilots could be trained quickly, and by the Army ground organizations. This whole question is still under consideration.

Easily maneuverable in small areas, these little liaison craft hop over rough country, skim the treetops, peer right down into the remotest areas, and bring back, or radio, reports that are the basis for tactical movements by the ground forces. Without these bird's-eye views of terrain and the minute detail that can be secured by flying close to the ground, military planning is restricted in modern warfare. Quick troop movements to the right places may easily be planned from aerial observation.

In the picture on the opposite page are the L-4B *Cub*, built by PIPER; the *Defender* L-3B (left background), by AERONAUTICAL CORPORATION; and the L-2B (right background), a TAYLORCRAFT. All three are powered by the Continental or other 4-cylinder, 65 h.p. engines. Top speed is 75 to 85 m.p.h., each design differing a little, and cruising speed is 65 to 70 m.p.h. Construction is similar in all three makes—steel-tubing fuselages, fabric-covered, and wings of spruce spars with either wood or metal ribs, fabric-covered. Gross weight of each runs about 1100 pounds, and range is under 300 miles. Wingspreads are all about 35 or 36 feet.

The production of these little planes formerly used by sportsmen means that private flying, in a sense, is being kept alive in America—the only belligerent nation where this is true.



HARVARD · NORTH AMERICAN AT-6

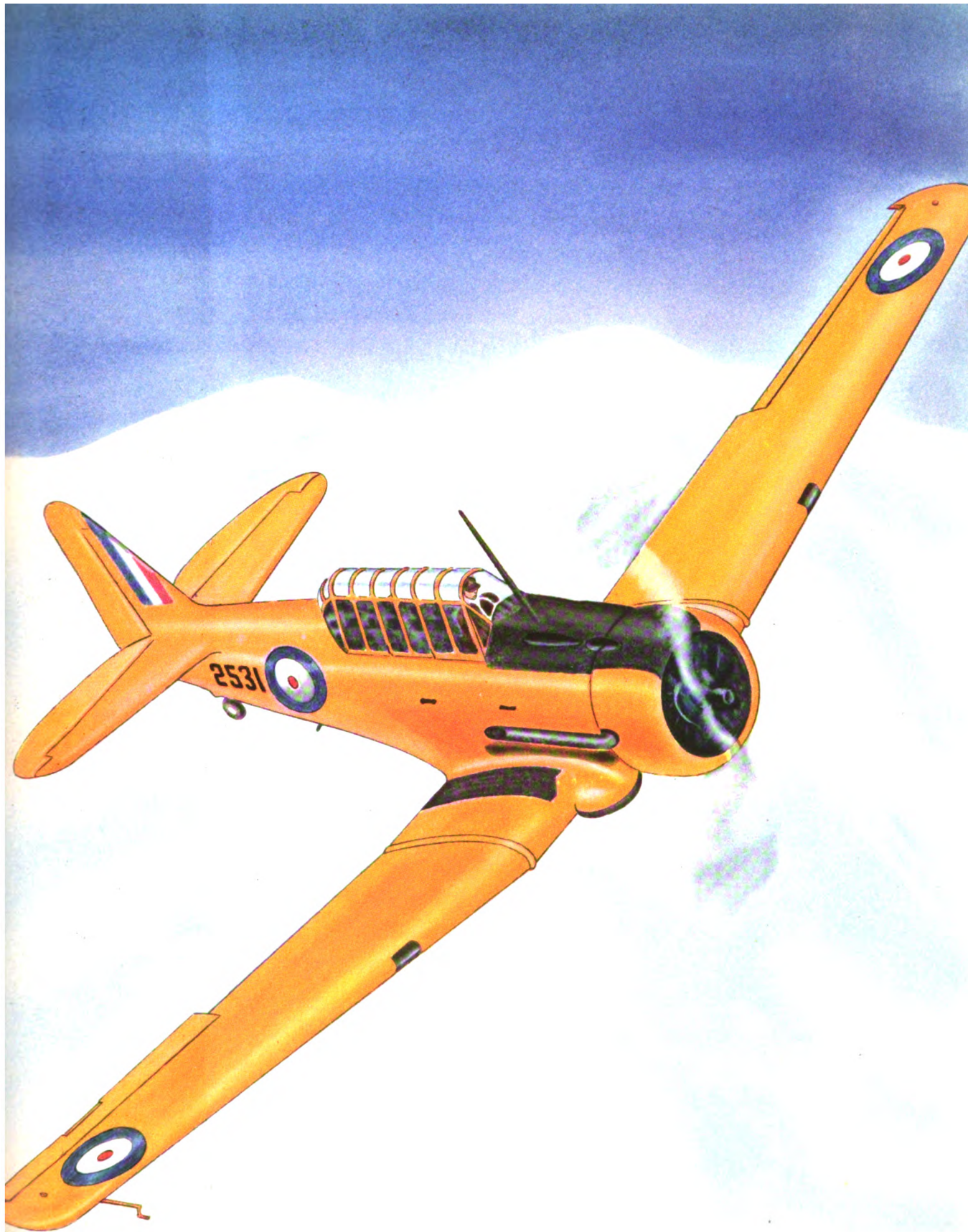
THE AT-6A, like all North American aircraft, is a "pilot's airplane," for all pilots who have flown it hold it in high regard.

Very clean in design and like a pursuit plane in appearance, the *Harvard* is in large-quantity production for England, Canada, and our own Army and Navy. Canadian orders alone for the AT-6A were greater than the combined foreign orders for any single American type before Pearl Harbor.

Construction is of metal with stressed metal skin covering except the movable control surfaces, which are fabric-covered. The landing gear retracts into wing wells which form a streamlined entry of the wings to the fuselage. Wingspan is 42 feet, length is 29 feet, and height is nearly 12 feet. Normal gross weight is 5249 pounds.

Power is supplied by a Pratt and Whitney 550 h.p. Wasp air-cooled engine; the propeller is two-bladed, with two-position controllable pitch. Maximum speed, at 5000 feet, is 205 m.p.h. and cruising speed, at 12,000 feet, is 180 m.p.h. Landing speed, with flaps, is 67 m.p.h. Climb is 1350 feet a minute. Service ceiling is 23,000 feet and range, carrying 111 gallons of fuel and 9½ gallons of lubricating oil, is 730 miles. Cockpits are tandem, with individually operated sliding enclosures. The pilot's seat, as on all military planes, is adjustable and the gunner's seat is both adjustable and rotating.

Provision is made on the nose for either one or two .30 caliber machine guns, synchronized to fire through the propeller arc, and the rear cockpit is fitted with a flexible .30 caliber machine gun. Bomb racks can be fitted into the underside of the wing structure if desired. Tow-target equipment can be installed on the underside of the fuselage, just aft of the rear cockpit. The *Harvard* is used for tow-target gunnery practice, aerial-combat and ground-attack training, and also for quick hops over the country by military personnel. Navy use includes carrier deck-landing practice. The newest Navy version is designated SNJ-3.



HELLDIVER · CURTISS SB2C

THE CURTISS SB₂C-3 is the latest addition to the U. S. Navy dive-bomber ranks. Together with the BREWSTER *Buccaneer* it can strike harder, can fly faster, and has a longer range than any other airplane of its type in use today.

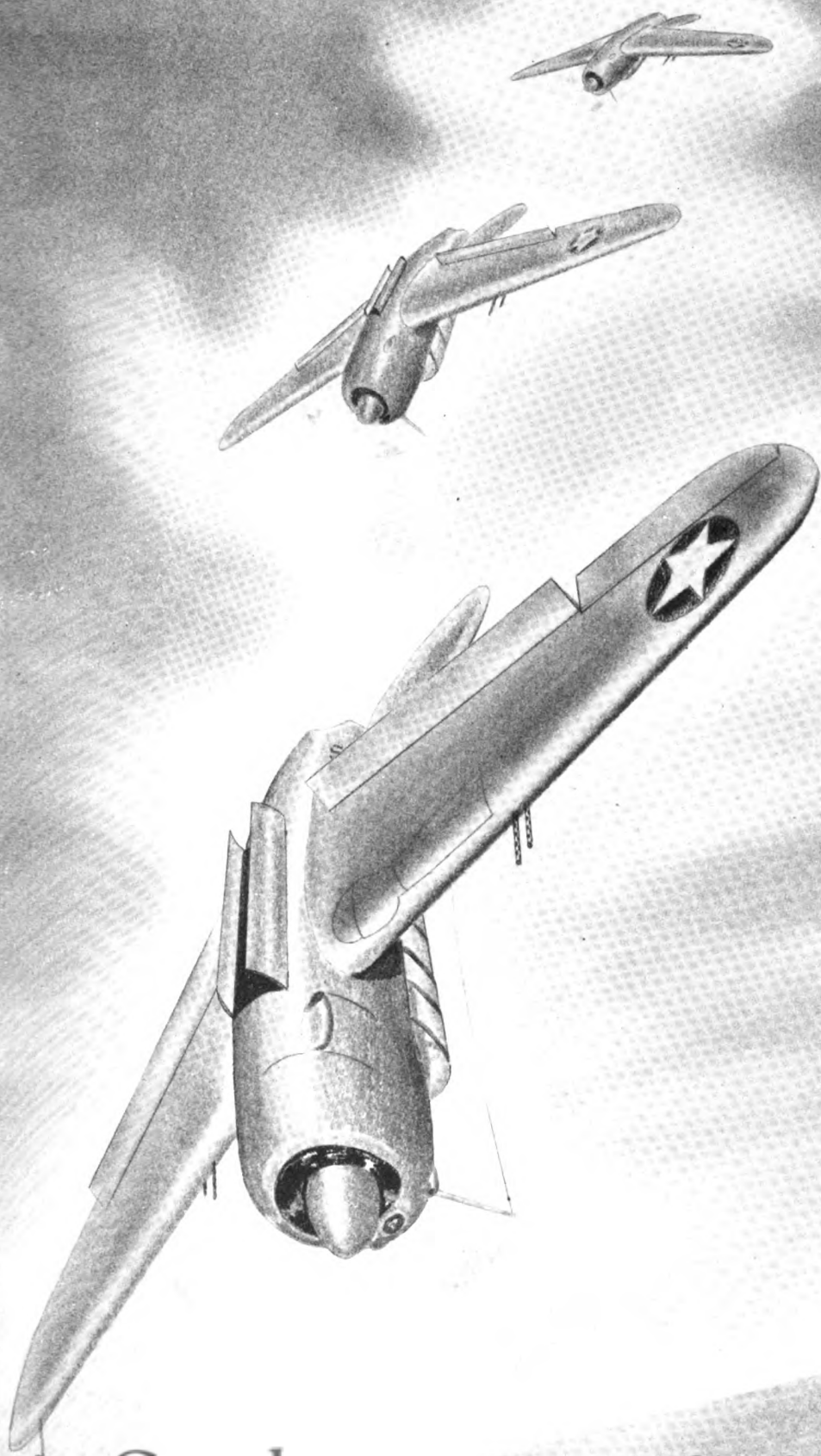
The *Helldiver* is an all-metal, two-place midwing plane with a fully retractable landing gear. Having undergone many changes since the original experimental model, the plane is now being produced in ever-increasing numbers. The Army designation is A-25.

Featured in the *Helldiver* are such improvements as unusually heavy armament, and bomb load carried in racks inside the fuselage, to be released through swinging bay doors. Hydraulically operated controls ensure movement in high-speed-dive pull-outs; slots on the wing leading edge lend stability at low speeds and are probably extended, along with the trailing-edge flaps, in steep dives to slow the velocity usually attained.

Powered by a 1700 h.p. Wright double-row engine and using a Curtiss three-bladed electric propeller, the *Helldiver* has an estimated top speed of around 300 m.p.h., carrying approximately a ton of bombs. It has a wingspan of nearly 50 feet, is over 35 feet in length, and stands nearly 17 feet high. Wings are folding-type for carrier stowage. All other data on this plane have not been released.

Dive bombers like the curriss *Helldiver* are taking over the work of big guns, hauling explosive charges farther and placing them more accurately than the biggest, best-manned naval rifles. On a search attack mission, when an attack is to be delivered the enemy after location, it becomes necessary to make a choice of loading. The *Helldiver* may be operated with its full gas load and a reduced bomb load for a maximum radius of action, or it may be operated with a maximum bomb load and reduced gas load with a reduced radius.

This newest and deadliest dive bomber is destined to make a name for itself in the near future, and news of it will probably be coming out of the battle areas by the time you read this.



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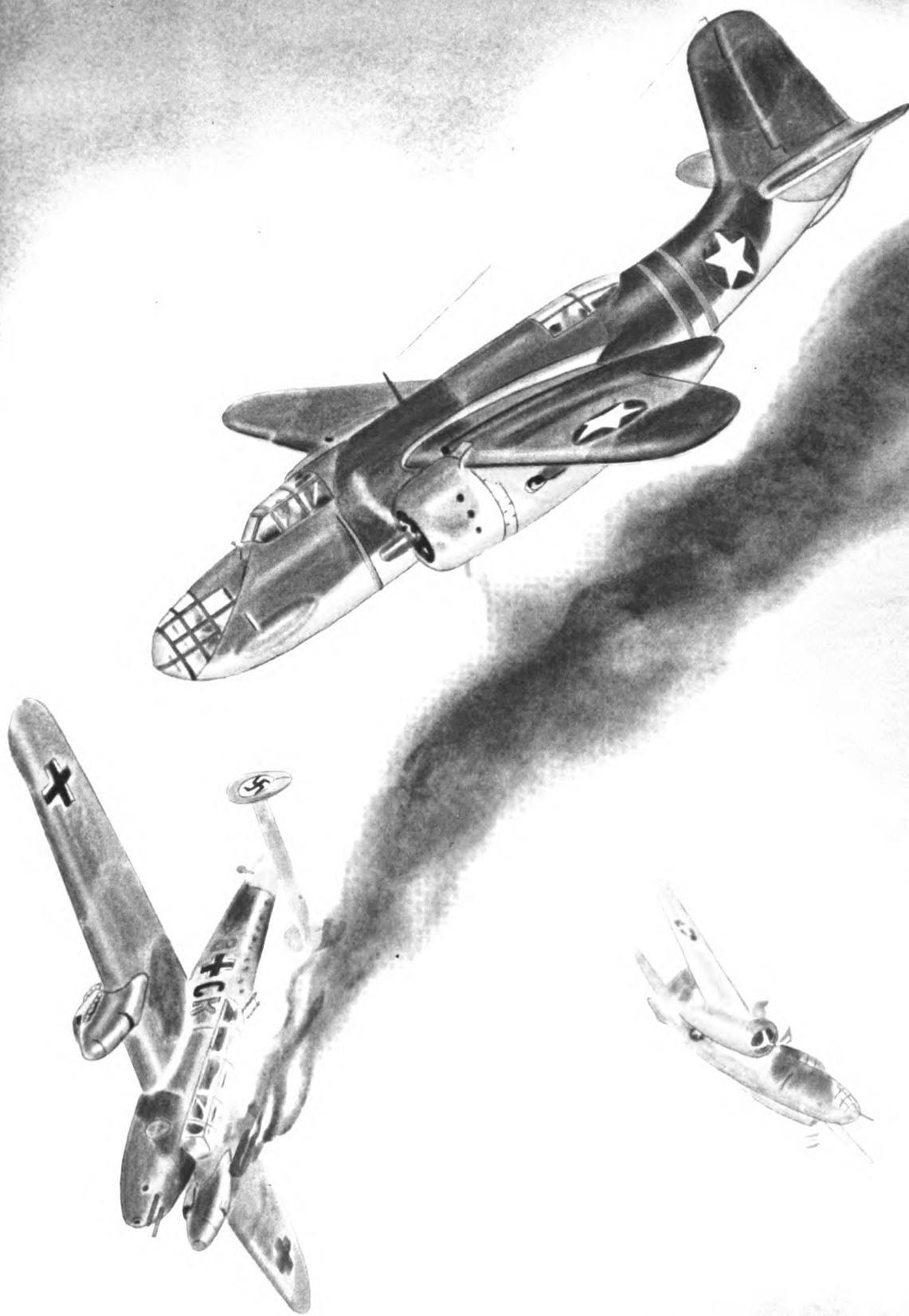
HAVOC · DOUGLAS A-20

THE DOUGLAS A-20 is the most versatile fighting airplane World War II has produced. Originally designed as a light or attack bomber, the plane is now operating on all Allied fronts—as an attack bomber, night fighter, interceptor, torpedo bomber, pursuit plane, long-range fighter, reconnaissance plane. It has other roles, as the enemy will discover.

The A-20 combines high maneuverability with a speed of more than 350 m.p.h. It carries machine guns fore and aft, a good-sized bomb load, and a crew of three—pilot, bombardier, and rear gunner. Its nose can mount extra guns, and its spacious bomb bays can be used for any number of things from extra fuel tanks to cameras or torpedoes.

The export model, the DB-7, was first equipped with two 900 h.p. engines and was called the *Boston* by the British. After observing its speed and maneuverability the British mounted four extra guns in the nose, painted the ship jet black, and called it *Havoc*. It is a night fighter. Four more guns, making a total of twelve, were added later, giving the *Havoc* the heaviest striking power of any ship of its type. So deadly was its fire power that often R. A. F. pilots shot down enemy fighters and bombers with a single blast of the guns. The *Havoc*, A-20B, is powered by two Wright 1750 h.p. double-row engines; its length is 47 feet and the wingspan is 61 feet. It is of all-metal construction, has a tricycle landing gear that retracts fully and a steerable nose wheel.

During the “Battle of Britain” the *Havoc* was used for intrusion tactics. Every night, enemy airdromes in Europe were each assigned to a squadron of *Havocs*. The *Havoc* would circle the airdrome and shoot down each Nazi plane as it turned on its navigation lights to land. *Havoc* pilots after intrusion missions reported that they sometimes found as many as ten German bombers circling to land in turn. An R. A. F. pilot would join the circle and shoot at everything in sight, confident that his was the only British plane about. One pilot said, “This maneuver is just a piece of cake . . . we shoot at everything we see, frequently getting two or three . . . pretty soon the Jerries get so jumpy they start firing at each other.”



KINGFISHER · VOUGHT OS2U

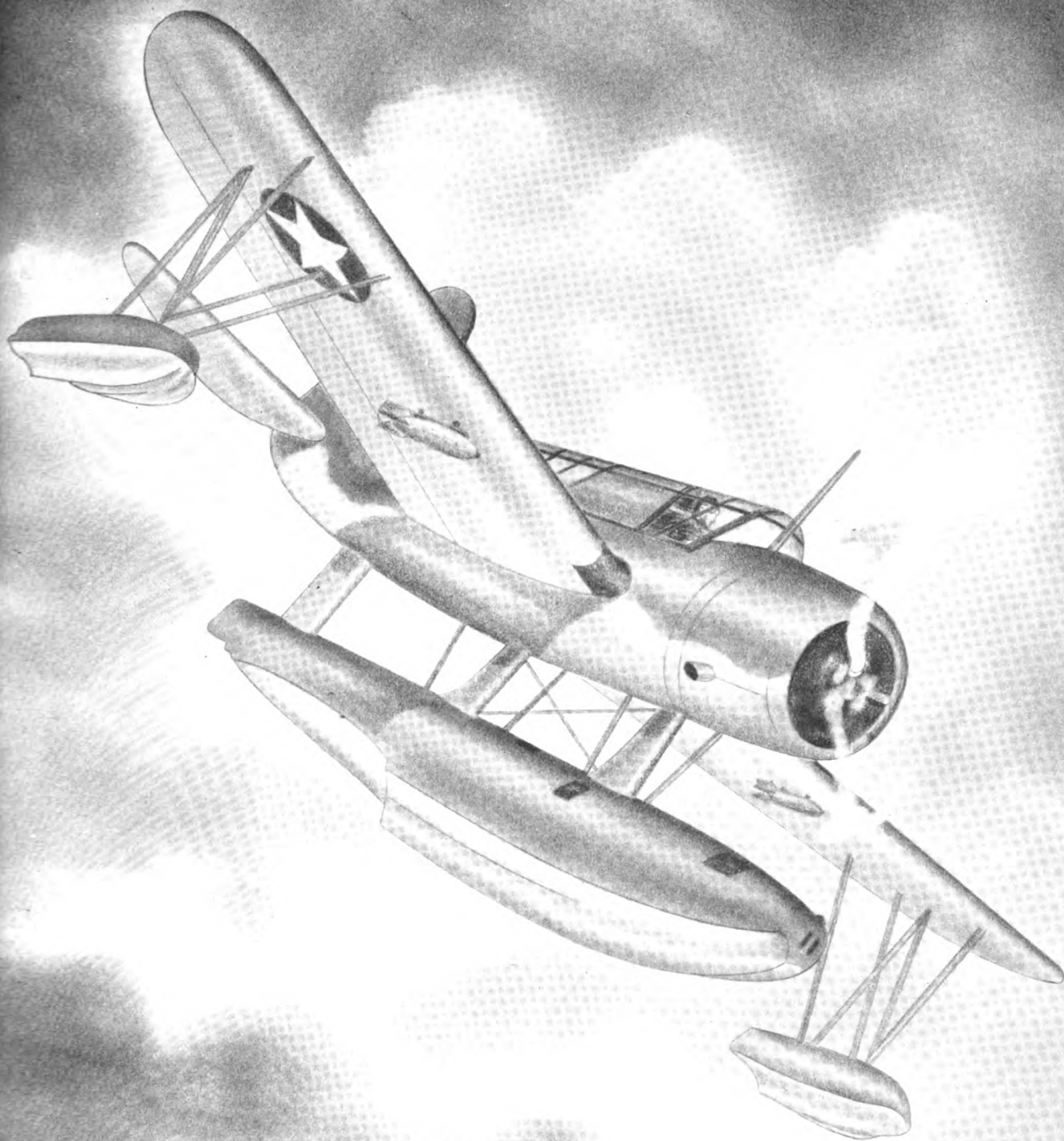
THIS PLANE helped to write another thrilling chapter in naval aviation when a Navy pilot and gunner rescued Captain Eddie Rickenbacker and his mates after their ordeal in the South Pacific. Lashed to the wing of a *Kingfisher*, some of the survivors were taxied forty miles through heavy seas to land.

The *Kingfisher* is equipped either as a landplane or as a seaplane. Land-based, it is being used by the Navy as a basic trainer as well as for patrol work. As a seaplane it is catapulted from battleships and cruisers, in both the U. S. and the British Navy. It also does a great deal of patrol work off our coasts, mostly on floats.

The wingspan is 36 feet; the length is 30 feet as a landplane and 34 feet as a seaplane. The OS2U-3 is the latest development of the OS2U series. It is powered by a Pratt and Whitney Wasp Jr. 450 h.p. radial engine, giving it a cruising speed of 160 to 170 m.p.h. and a range of about 700 miles. It carries a fixed .30 caliber machine gun firing through the nose and propeller disk and a flexible machine gun in the rear cockpit. Bomb racks on the wing undersides carry either bombs or two 325 pound depth charges. This feature has made the *Kingfisher* very effective in the Pacific area in antisubmarine work.

The *Kingfisher's* wings are of single-span, full-cantilever construction and consist of a center section and two outer panels. Leading edge of wing is metal-covered, trailing edge fabric-covered. Fuselage is all-metal and monocoque. Control surfaces are metal, the fixed surfaces being metal-covered and the movable ones fabric-covered. The *Kingfisher* is built very strong to withstand the strain of catapult use.

Hundreds upon hundreds of *Kingfishers* are constantly on duty with the Navy over the seven seas. Seeking out the enemy, attacking submarines, and directing gunfire are some of their vital tasks.



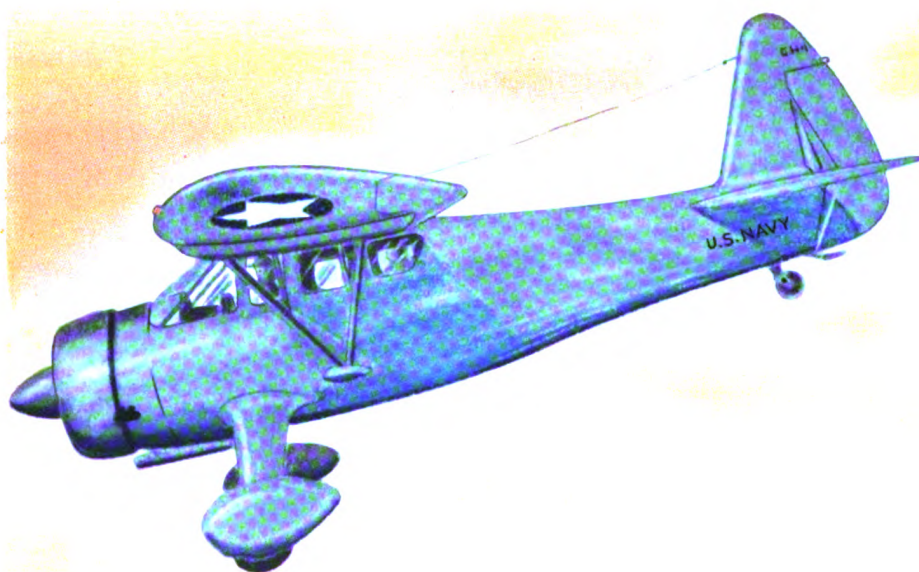
HOWARD GH-1

EVOLVED FROM a famous line of racing planes, the HOWARD GH-1 is the latest model to come off the production line of a manufacturer experienced in the building and flying of aircraft. Supplied to the Navy, and used as a cargo and personnel transport, the GH-1 is identical with the recent HOWARD planes sold commercially for fast cross-country trips by business concerns and for private use. Benny Howard once said that as aircraft producers always tacked complicated numbers and letters to their planes, to denote the model, he would follow suit by designating his airplanes as DGA (meaning Damn Good Airplane!) with the model number after them. Thus the GH-1, being the latest model, was known first commercially as the DGA-15.

Wing construction is of solid spruce spars, built-up ribs, plywood and fabric-covered. The fuselage is made up of welded tube structure, dural-covered cabin section and tail section and the rest fabric-covered. Tail surfaces are of welded steel tubing and are also fabric-covered.

Carrying five persons and powered by any one of three engines from 330 to 450 h.p., the HOWARD shows a top speed of 178 to 201 m.p.h. at 4000 feet and cruising speeds of from 165 to 191 at cruising altitude. Landing speed is 61 m.p.h. Wingspread is 38 feet and length is 25 feet. The range is exceptional with either the Jacobs 330 or the Wright 350 engine, in that 1280 miles at cruising speed is claimed. Range with the 450 h.p. Wasp Jr. is 785, but it is this engine that gives the HOWARD the top speed of 201 m.p.h. and the 191 m.p.h. cruising speed.

The HOWARD cannot be flown by everyone as it is known as a relatively "hot" plane but capable pilots experience no difficulties at all.



LANCER · REPUBLIC P-43

THE REPUBLIC P-43 is a high-altitude pursuit interceptor using a supercharger installation that gives peak efficiency at substratosphere altitudes.

Although they are no longer being built, several hundred of these planes are still in use and have been reported to be in combat against the Japanese in China. Equipped with oblique aerial camera equipment, they are being used for speedy scouting across the enemy lines. The *Lancer* is the forerunner of our new P-47 *Thunderbolt*. The planes are very much alike in appearance except that the *Lancer* is much smaller.

Structurally, the all-metal fuselage is of semi-monocoque design. The framework is covered by a smooth metal skin, flush-riveted to the frames and stringers. The forward portion of the fuselage incorporates a built-in stainless-steel fire wall to which the engine mount attaches. The cockpit is amply large to provide room for the pilot and his equipment. Structural equipment includes full armor plating and a crash protector for the pilot. Visibility from the cockpit is good in that the pilot can see forward and downward, and the design of the canopy and turtle deck permits unobstructed vision behind.

The wing is all-metal, full-cantilever, and the center section houses two self-sealing bulletproof fuel tanks. These fuel tanks carry 145 gallons of gas each. The outer wing panels each contain an overload fuel tank and hold a total of 73 gallons. Power is supplied by a 1200 h.p. Twin Row Wasp engine, which gives it a top speed of around 375 m.p.h. and a cruising speed of 310 m.p.h. Landing speed, with flaps, is 86 m.p.h. and climb at sea level is 3380 feet per minute. Cruising range at 66 per cent power is 960 miles and gross weight is 7155 pounds.

The *Lancer* is said to be one of the most intricate military machines in the world. It performs well, but is underarmed according to present-day requirements.



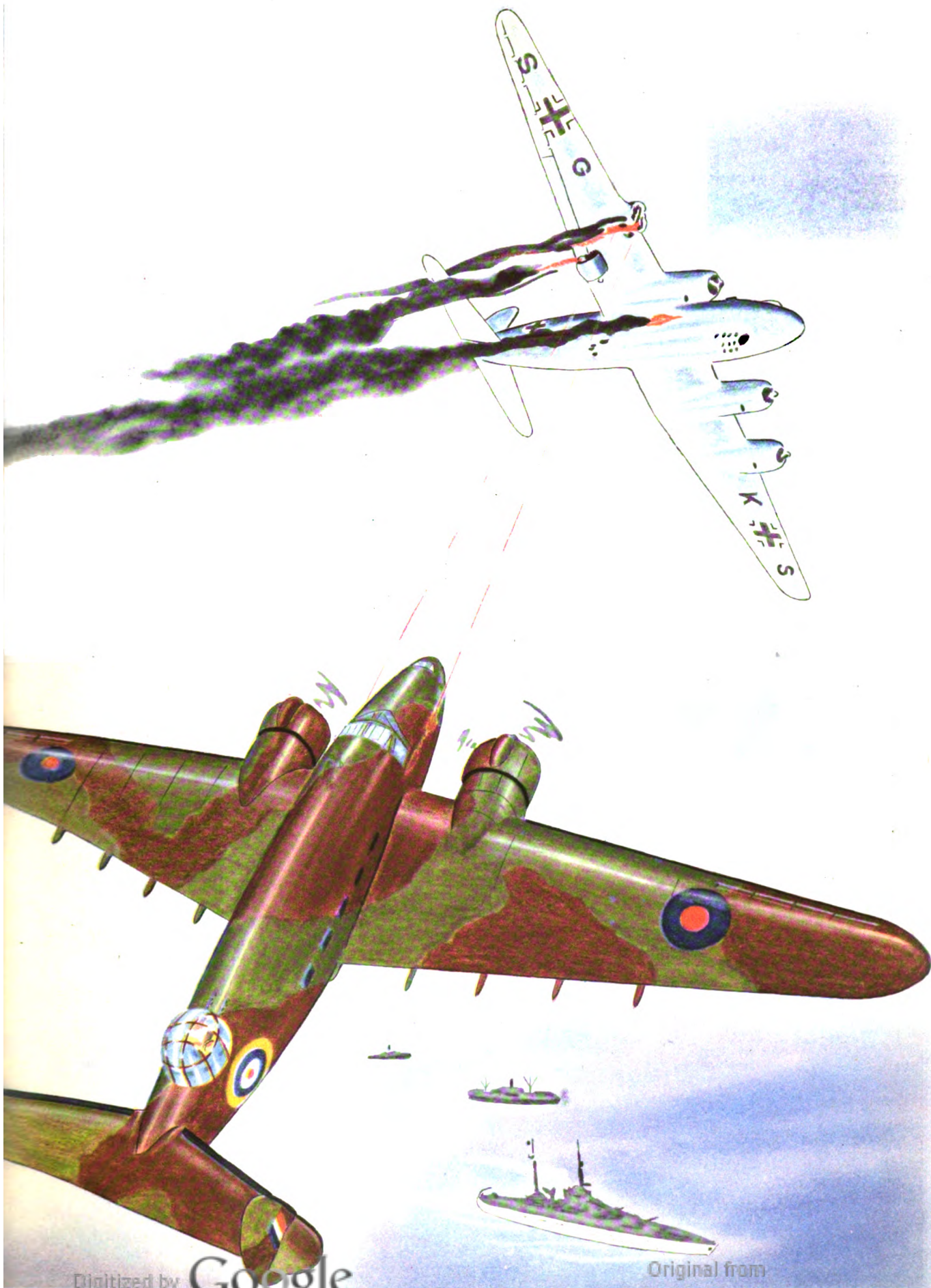
HUDSON · LOCKHEED A-29

LOCKHEED'S HUDSON A-29, first American-made bomber to see action in World War II and affectionately called "*Old Boomerang*" by the Coastal Command of the R. A. F. because it always comes back, has become a household word throughout the British Empire. These planes have set up a reputation for sturdiness, durability, and ability to "take it."

Named after the famous British navigator and explorer, Henry Hudson, the A-29 was designed as an air liner and redesigned for war duty. Many military men consider it remarkable that a revised air-line transport has proved to be one of the most versatile aircraft of the war. From its original purpose as a reconnaissance scout plane, the *Hudson* has been used as an all-around combat plane: dive bomber, strafer, raider, fighter, and convoy patrol craft. Its most important work has been with the Coastal Command, escorting convoys hundreds of thousands of hours and keeping a constant alert for enemy submarines, ships, and aircraft. Britain has received more than 2000 *Hudsons*, some by ship, most by air.

Constantly improved to keep pace with the war, the *Hudson* has the following features. It is all-metal, with stressed skin and flush riveting; the wingspan is 65½ feet, length over 44 feet, and height 12 feet. It is powered by two Wright Cyclones of 1200 h.p. each (available for take-off); top speed is 284 m.p.h., cruising speed is 255 m.p.h., and landing speed is 72 m.p.h. with flaps. Climb at sea level is 2215 feet the first minute. Absolute ceiling is 26,500 feet. Range, with 644 gallons of gas, is 2160 miles and gross weight is 18,500 pounds; overload gross weight is 20,000 pounds. It has two fixed machine guns in the nose, two turret guns, and a tunnel gun. Window guns were installed in England. No German bomber has been able consistently to outfight the *Hudson*. More maneuverable than their bombers, the Germans avoid combat.

Tales of the *Hudson's* exploits are legend. They begin with the first day of the war, and daily there are new ones. Among the most notable achievements was the capture of a submarine by a *Hudson* crew, which bombed and machine-gunned the U-boat into surrender.



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Hudson, LOCKHEED A-29A

NAVY N3N

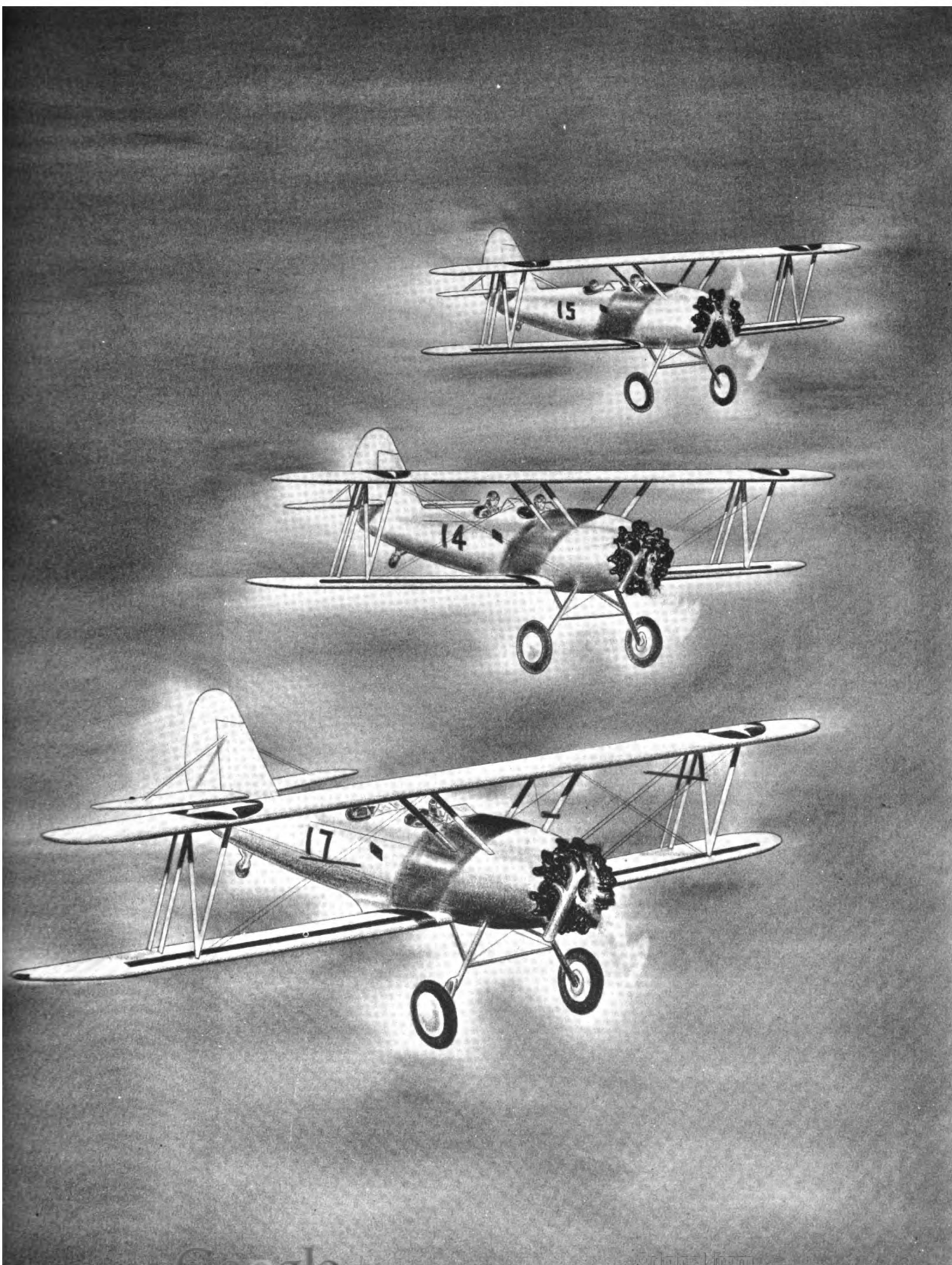
MANY NAVY PILOTS have received their first training on the stanch N3N, built under license by the naval-aircraft factory near Philadelphia and affectionately nicknamed the "*Yellow Peril*." This plane is in use at most of the Navy's nineteen primary training bases over the country. The latest model is the N3N-3.

A Navy trainer has to be an all-purpose trainer and not just a machine which will take off with two men aboard and fly with reasonable safety in the hands of a novice. All the required qualifications are found in the N3N. It can be flown as a landplane with wheel gear, or as a seaplane with a single float and with wing-tip pontoons. The N3N has been in production at the naval factory since 1938 but never has received the publicity of other models built by commercial firms.

The plane is of all-metal construction. It carries special equipment to simulate many Navy conditions, and special deck-landing and signal equipment for training on aircraft-carrier decks. The young Navy fledglings learn routine deck-landing procedure first on land with a deck outline marked. On floats and catapulted from launching gear on land, the student learns seaplane operation just as it is aboard a cruiser or battleship.

When an aircraft is launched from a catapult, picking up sixty miles per hour in the thirty-foot length of the track, it is necessary for the occupants of the plane to place the back of their heads against the rear of the cockpit or on the headrest, to prevent their heads from being snapped back by the inertia and perhaps being knocked out by contact with the headrest.

The N3N-3 is fitted with a Wright engine of 235 h.p. It handles well in acrobatics as well as in normal flying positions.



LIBERATOR · CONSOLIDATED B-24

THE CONSOLIDATED B-24 (Army)—the PB4Y (Navy)—has been fully tested over Europe, the Aleutians, the South Seas, and North Africa. Lacking at first the fire power for protection at certain angles, the *Liberator* has undergone many changes which have made it a formidable bomber, and it is being constantly improved to keep its position as one of the finest planes of its class. It is today the deadliest long-range heavy bomber in action for the United States.

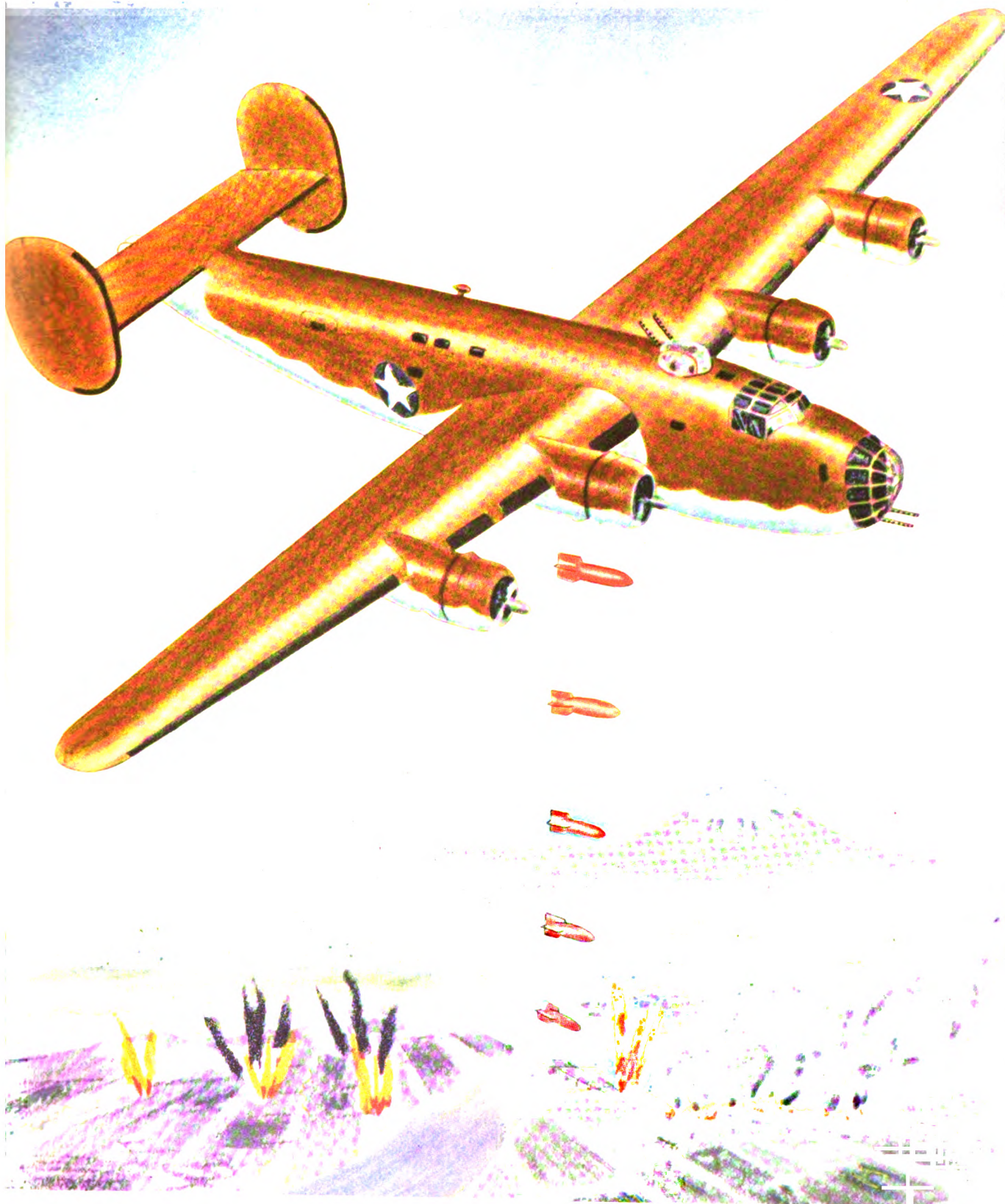
Slightly faster than the *Fortress* and with a somewhat longer range, it can fly, like the *Fortress*, well above 30,000 feet, where enemy anti-aircraft and fighters reach with difficulty and from where it can drop its 8000 pound bombload with deadly accuracy.

About five years newer in design than comparative types, the *Liberator* incorporates the new and radical Davis high-lift, high-speed wing section, for its superior performance. This wing design, of narrow chord, will no doubt play a great part in the winning of the war. All-metal and of stressed-skin construction excepting the control surfaces, which are fabric-covered, the B-24 has a retractable tricycle-type landing gear, with the single wheel forward retracting into the fuselage and the rear wheels into wing wells. Wingspan is 110 feet, length of fuselage is 64 feet, and overall height is 19 feet. Tactical requirements are for a crew of from six to nine, depending on the mission to be performed.

Power is supplied by four Pratt and Whitney 14 cylinder Twin Row engines of 1200 h.p., and the top speed is over 300 m.p.h. Cruising range is well over 3000 miles with a loaded gross weight of 40,000 pounds.

The *Liberator* mounts at least eight .50 caliber machine guns. Flying in close formation for mutual protection on raiding sorties, the *Liberators* are able to concentrate withering fire power in any direction.

Converted into a cargo transport, the *Liberator*, known as the C-87, can carry six tons of freight and is ferrying military supplies to our fighting forces. *Liberator* bombers and transports have broken all records for trans-Atlantic and trans-Pacific crossings.



NORTH AMERICAN BT-14

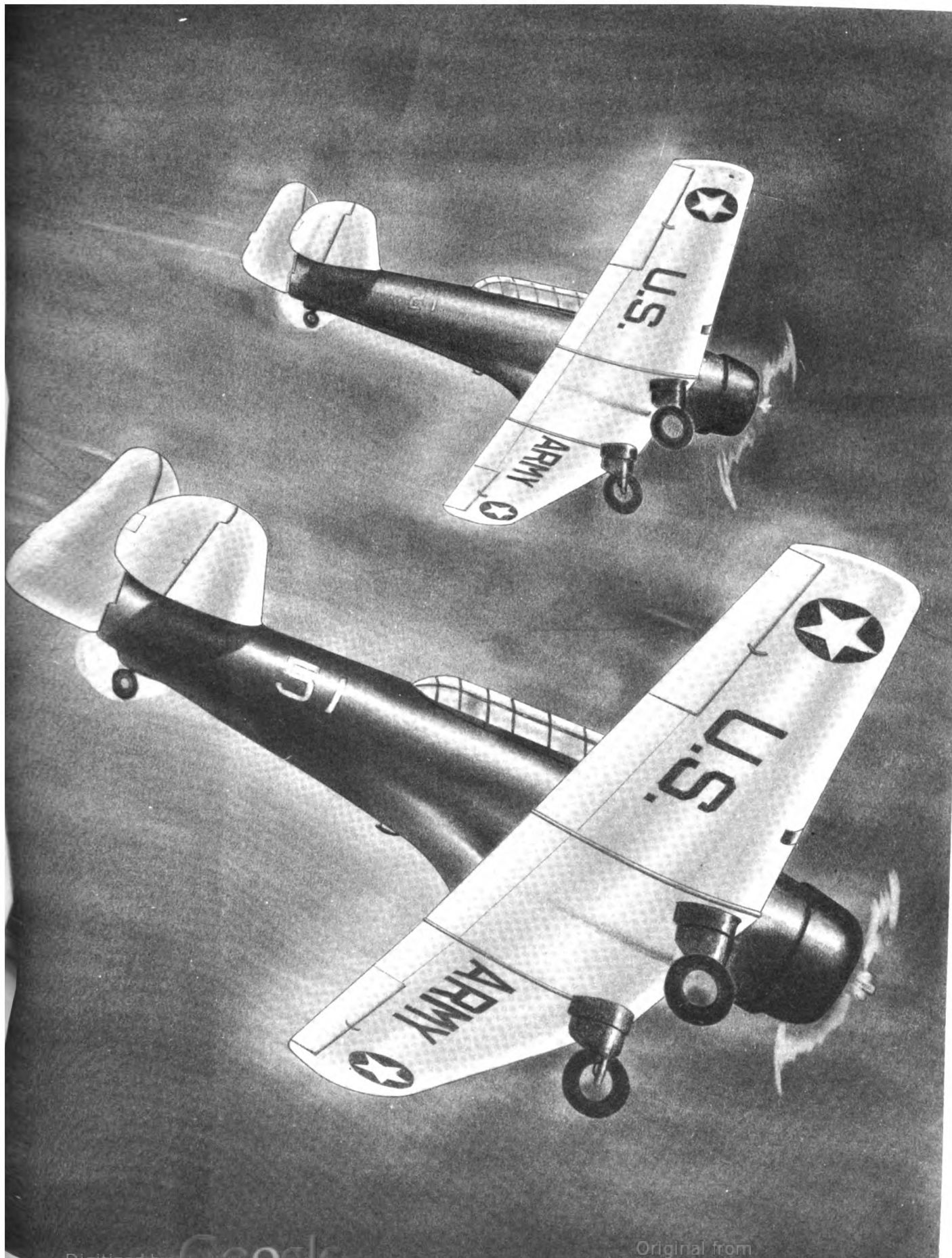
PROBABLY USED to train more basic-stage students than any other one type, the BT-14 is known to Canadian pilots as the *Yale*. It is similar in appearance to the famed AT-6 *Harvard* with the exception of the landing gear, which is the fixed type.

The BT-14 is not restricted and can be used for all acrobatic maneuvers. The fuselage is all-metal, has a sliding cockpit enclosure with a tandem seating arrangement and dual controls. The wing is also all-metal and is full-cantilever. Flaps are provided and are manually operated. Movable rudder and elevators are fabric-covered. A controllable-pitch propeller is standard. The plane has hydraulic brakes, a parking brake, navigation and landing lights.

The complement of instruments for the use of instructor and student in a basic-training plane is interesting. Each cockpit of the BT-14 has a sensitive altimeter, thermocouple and manifold pressure gauge, clock, fuel gauge, tachometer (to show engine r.p.m.), ammeter, gyro-horizon (for blind flight), airspeed indicator, turn and bank indicator, rate of climb indicator, compass, carburetor temperature gauge, suction gauge, and fuel-pressure signal.

Wingspan is 41 feet, length is 28 feet, and height is nearly 11 feet. Gross weight is 4375 pounds and fuel capacity is 104 gallons. Power is by a Wright Whirlwind engine of 420 h.p. Top speed is 160 m.p.h., cruising speed is 140 m.p.h., and landing speed, with flaps, is 65 m.p.h. Service ceiling is 17,400 feet, rate of climb is 1100 feet per minute, and cruising range is 730 miles.

Like other basic trainers, this plane is equipped with a two-way radio, for both code and voice. It is in the basic phase of flight training that Air Force Cadets are introduced to the radio navigational procedure used in cross-country flights.



LIGHTNING · LOCKHEED P-38

THE LOCKHEED P-38 was designed as a long-range, high-altitude interceptor. With its fire power of four machine guns, and a 37 mm. cannon group mounted on the nose, it is a formidable heavyweight slugger, and is now in action on several major fronts.

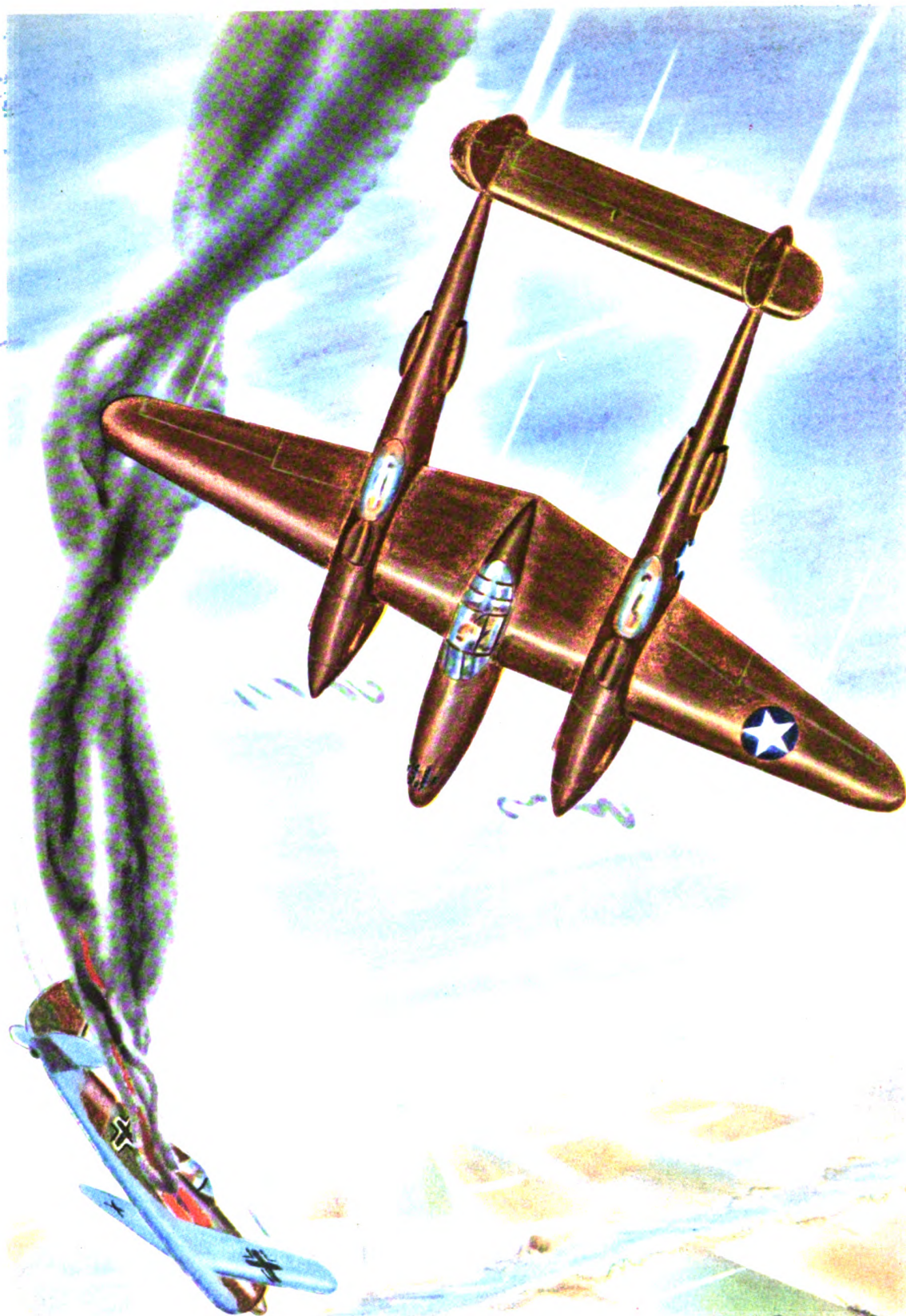
An all-metal airplane, the *Lightning* has two Allison V-type liquid-cooled engines and is equipped with turbo-superchargers, enabling the engines to be supplied with the proper amount of air for maximum efficiency at high altitudes.

It is the fastest-climbing airplane in the world and has the longest range of any single-seater fighter now in the air. It easily outclimbs the Jap Zero and is much faster in level flight. On long-range missions *Lightning* pilots have frequently climbed to cruising altitude, shut off one engine, feathered the propeller, and proceeded to the battle area on the other engine. Near the destination, the idle engine is started and warmed up for use in combat. Speed is over 400 m.p.h. The left propeller on the *Lightning* is geared to reverse direction so as to neutralize the torque action, thus enhancing control in piloting.

Constantly being improved, the P-38 has protective armor plating for the pilot and for vital engine parts, also self-sealing gas tanks. Its tricycle landing gear is fully retractable, and the nose wheel is swivel type; brakes are mounted on the main wheels. Wing flaps, hydraulically operated, extend to the rear of the wing's trailing edge in landing, to slow the landing speed and to increase the glide angle for shorter approaches to the air field. When escorting attack, medium, and heavy bombers, the P-38 sweeps in ahead and clears the sky of fighter opposition whether it be Zeros or FOCKE-WULF 190's.

In North Africa the *Lightning* is writing history. In addition to escort duties, it is being used at low level in Tunisia to strafe ground objectives, troops, supply dumps, and transportation.

Every pilot that flies the P-38 is in love with the ship and says it climbs "like a homesick angel."



OWL · CURTISS O-52

THIS PLANE was designed for scouting missions and for maintaining liaison with infantry, artillery, and other ground troops in combat teamwork, and was built in quantity for the Army Air Forces.

As its popular name suggests, the *Owl* possesses particularly good "hovering" characteristics as well as excellent speed for its type. Many O-52's have been relegated to the training of observation and reconnaissance crews and are busily at work in this new duty at Brooks and other Army fields. They have many other duties in the A. A. F., tracking for antiaircraft and searchlight training crews, and are the standard observation and reconnaissance ships for the Army.

All-metal, the wing is equipped with both leading-edge slots and trailing-edge flaps and it can operate from very small landing strips. The landing gear is manually retracted. Provision is made for the mounting of one .30 caliber machine gun, forward-firing and mounted on the nose. The observer in the rear seat is also provided with a .30 caliber machine gun, swivel-mounted.

The *Owl* can be supplied with full radio equipment, both voice and code, and it can mount all the photographic equipment necessary for special assignments and missions. The plane is powered by a Pratt and Whitney Wasp engine of 650 h.p. Performance figures have never been made public, but top speed is probably close to 200 m.p.h. and landing speed around 50 m.p.h. with wing slots and flaps fully extended.

Due to tactical changes made necessary by the war, the *Owl* is no longer in production but is still being used in tactical work. When shipping was menaced by the presence of enemy submarines in the Gulf of Mexico shortly after Pearl Harbor, CURTISS Owls were dispatched to do patrol duty, covering the entire western area of the Gulf systematically with their loads of depth charges and bombs.



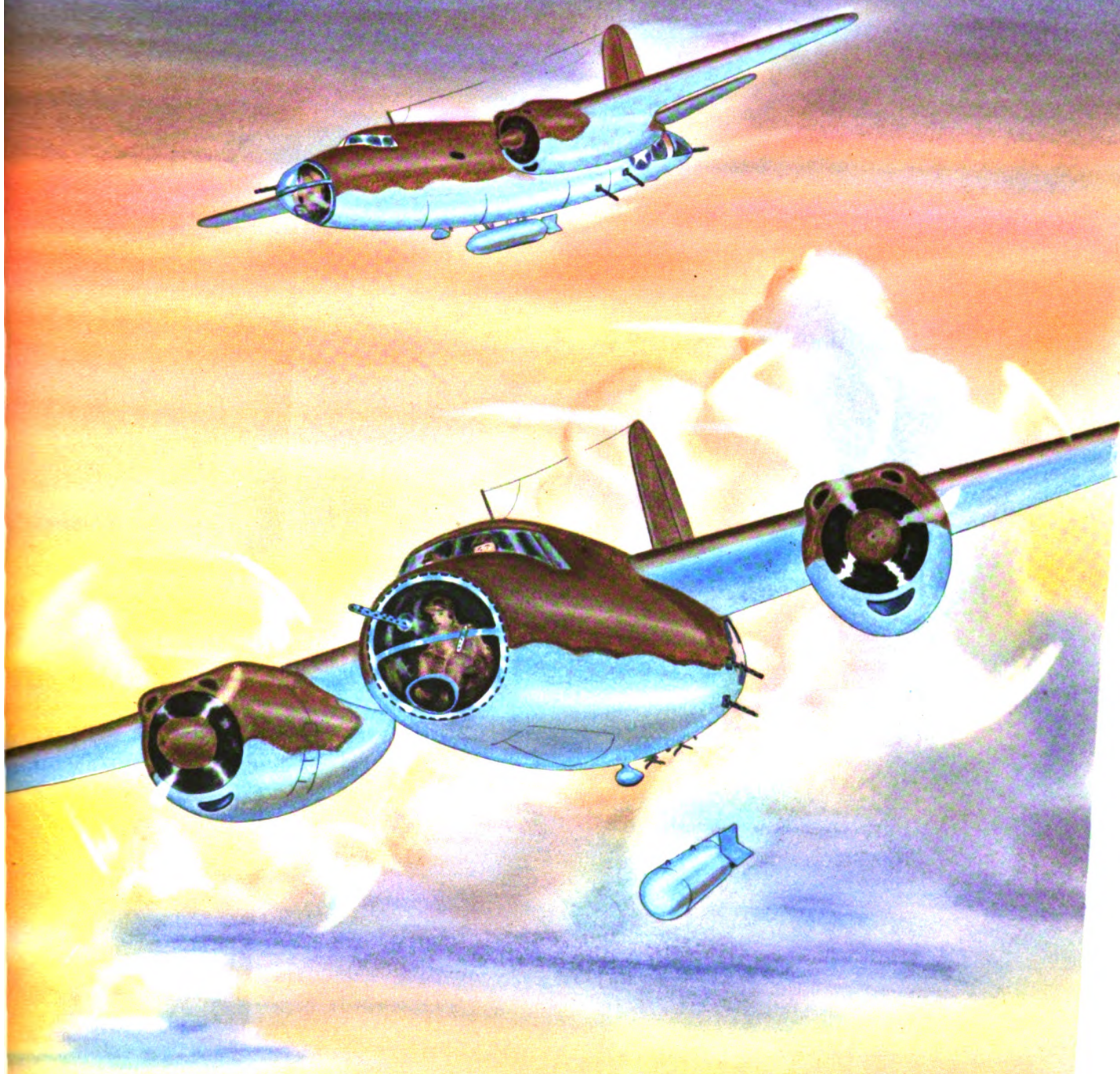
MARAUDER · MARTIN B-26

ONE OF the finest medium bombers in the world, the MARTIN B-26 is said by test pilots to be as maneuverable as a pursuit ship.

During the Japs' attempted attack on Midway Island, in which our combined Army, Navy, and Marine forces flew everything but the hangar doors out to greet the enemy, *Marauders*, with GRUMMAN *Avengers*, roared low over the water and loosed full-size 2000 pound torpedoes against the sides of the Japanese plane carriers, inflicting serious losses on the Japs. One *Marauder* wears four Jap vessels painted in miniature on the fuselage sides, to show its total bag in that battle. The B-26 is now a veteran, having seen duty and made a respectful name for itself on fronts all over the world.

All-metal in construction, the wingspan is 65 to 69 feet and the length is 58 feet. The *Marauder* is fitted with two 2000 h.p. Twin Row Pratt and Whitney engines, making it the fastest and the highest-horsepowered plane in its class. Top speed is over 350 m.p.h. and landing speed is nearly 110 m.p.h. Heavy-tread tires, brakes, and tricycle landing gear permit the plane to land safely at this speed. Four-bladed propellers are used to keep the prop diameter within size limits. The *Marauder* carries a five-man crew and 12 machine guns, making it, with its fine speed and maneuverability, a formidable opponent in any sky battle.

False reports about the *Marauder* have been discounted by the pilots themselves. The MARTIN B-26 was designed and rolled off the production line without the customary peace-time testing being possible, and so it did have some faults. However, these were quickly remedied and the plane is being constantly improved to meet war conditions. Refuting the fallacy that it is impossible to land or even glide the *Marauder* without power, the plane has been used in 90 degree power-off approaches, and one officer made three dead-engine landings. Wing section and flap area, plus weight of an aircraft, determine the glide angle, and there are many planes that have a steeper glide angle than the *Marauder*. In a word, an airplane of this design can be brought in more practicably with power.



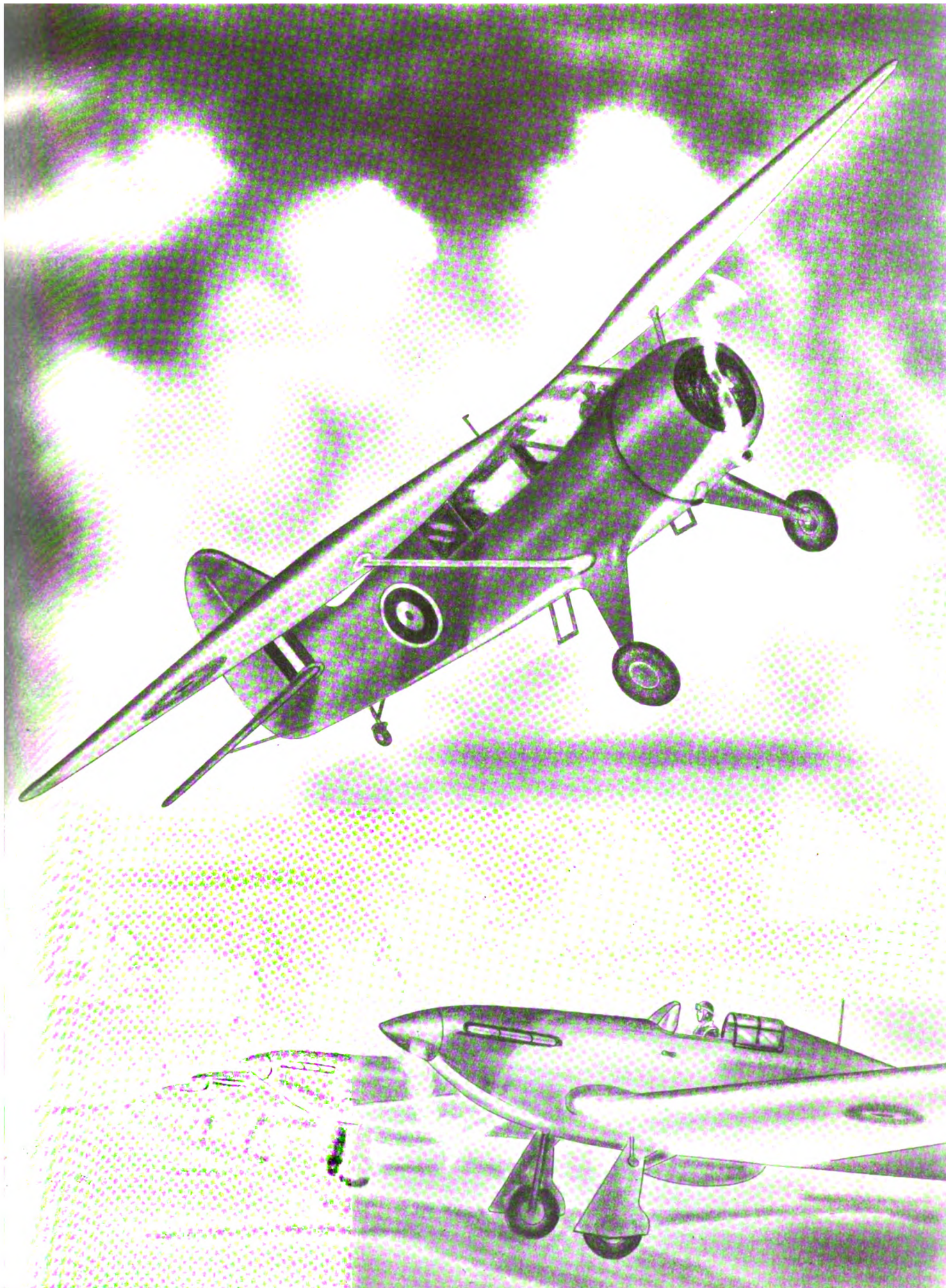
RELIANT · STINSON AT-19

THE STINSON AT-19, known to civilian pilots as the *Reliant*, has, justifiably, a world-wide reputation for dependability. It is attractive in appearance, both inside and out, and easily recognizable because of its unique gull-type wing.

The *Reliant* is now being used as an aerial navigation trainer by British Royal Navy pilots and is serving yeoman duty in our own services. One of its special uses is to tow light gliders, and it can pick up a glider while in flight. As it swooshes in low, a grappling hook from the plane grabs a detachable elastic cord stretched between poles. This cord is attached to the glider, which is on the ground. As the hook catches, a reel inside the plane pays out extra line, takes most of the shock of the glider's dead weight and draws it smoothly into the air. The fuselage of the *Reliant* is of welded steel tubing, fabric-covered. The STINSON line of planes has long been noted for the superb high-gloss finish of the fabric covering, but all this is now hidden under war paint. The wing is constructed of metal, with a welded steel spar and riveted dural tube ribs, all fabric-covered. The plane has wing trailing-edge flaps and a fixed-type landing gear.

Built under U. S. Army supervision for the British, this military *Reliant* is almost identical to the STINSONS which have, for many years, served on mail pick-up service with all American Aviation, on forest patrol and with a number of police departments. Several airlines are using the *Reliant* for instrument training planes.

Powered by a 290 h.p. engine, the *Reliant* cruises at 150 m.p.h., and the landing speed is 59 m.p.h. Service ceiling is 16,500 feet, cruising range is 800 miles, and gross weight is 4000 pounds. The wingspread is 42 feet and the length 28 feet.



MARINER · MARTIN PBM

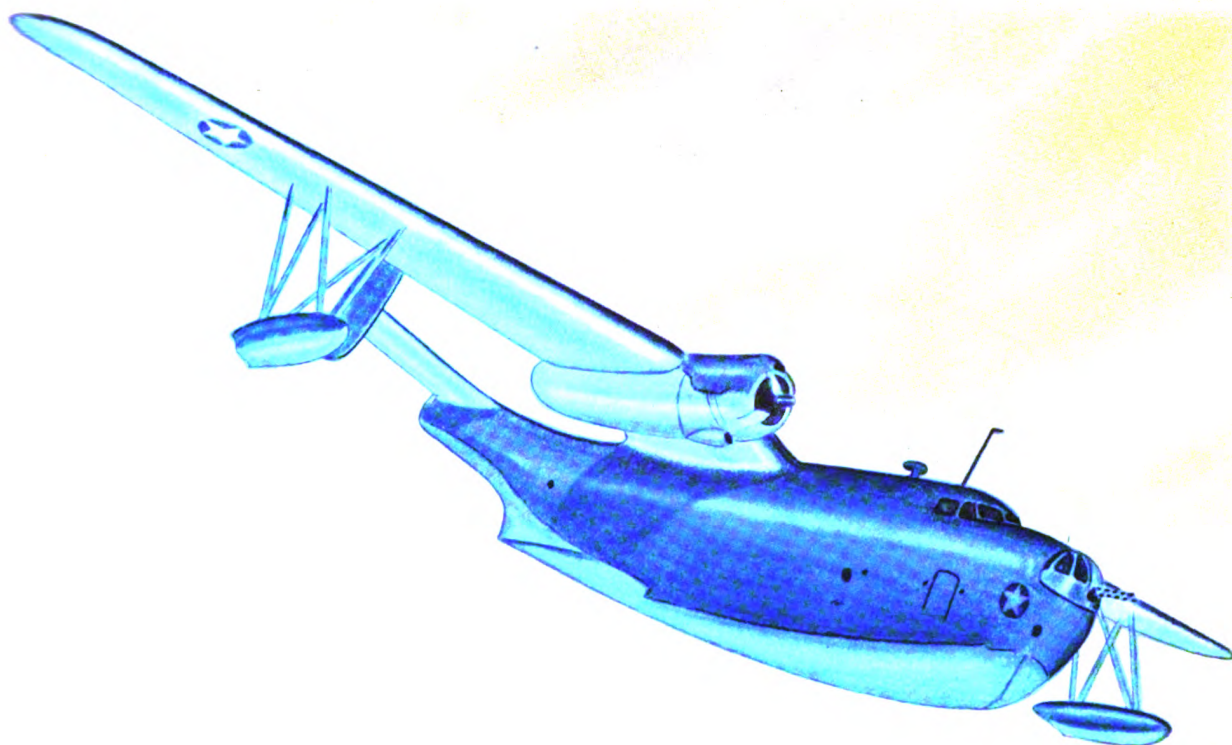
THE MARTIN PBM, designed as a patrol bomber, is doing a large part of the Navy antisubmarine patrol flying and is capable of sustained flight over the large areas assigned to it in this duty. The *Mariner* carries bombs, torpedoes, or depth charges, or a combination of these explosives, totaling three or more tons.

The patrol-bomber seaplane is built for sustained operation away from a fixed base, afloat or afloat. Several of these planes are assigned to a seaplane tender that has full facilities for engine change and overhaul, complete repair facilities, and fuel and oil for servicing the planes. Thus the patrol bomber may stay at sea for several months at a time.

The *Mariner's* wing is gull-shaped, to raise its engines high and give the propellers good clearance above the water. They are full-cantilever, metal and smooth metal skin-covered. The fuselage is also all-metal with smooth covering. There are four visible gun turrets, each probably housing two .50 caliber machine guns.

Wingspan is 118 feet, length is 77 feet, and height is 17½ feet. Loaded weight is around 40,000 pounds, and equipment includes full leading-edge deicing equipment, living quarters and complete galley facilities for a crew of seven or more, an auxiliary power plant, as well as soundproofing, heating, and ventilating installations. Powered by two 1600 h.p. double-row Wright engines, the *Mariner* has a top speed of over 225 m.p.h. and a cruising range of close to 5000 miles.

The latest model, the PBM-3 (depicted), has fixed wing-tip floats instead of retractable ones as did the earlier models. Fixed floats probably carry extra fuel. The *Mariner* can be quickly changed to a cargo airplane simply by removing all or part of the military equipment, depending on the route concerned, and installing facilities for carrying cargo. Many *Mariners* have already been so converted, and large amounts of important cargo are being hauled to distant points every month.



REPUBLIC AT-12

THE AT-12, originally built as a two-place combat plane for Sweden, is the forerunner of the *Lancer* and the *Thunderbolt*. Really a fighter-bomber, it has been converted for special advanced combat training.

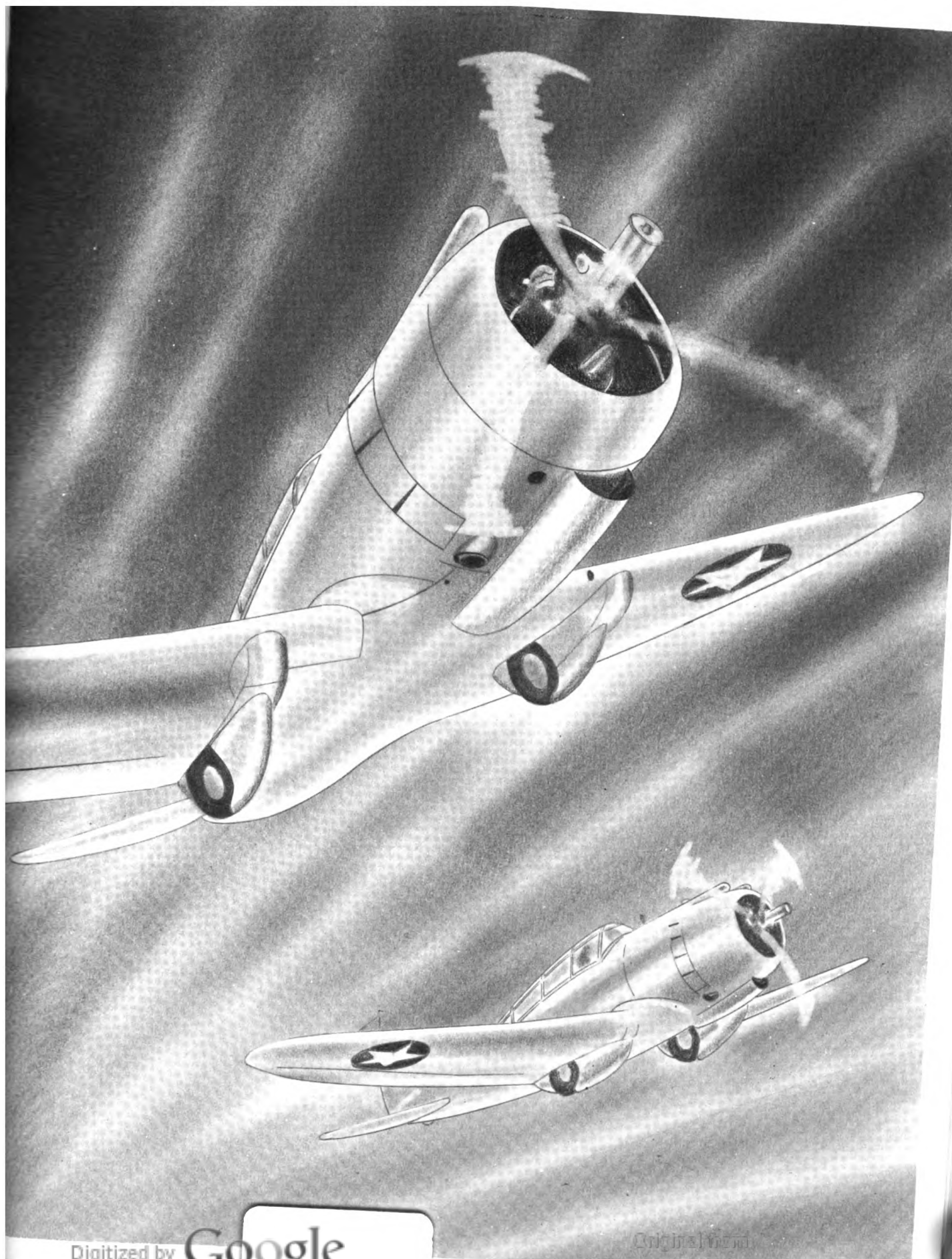
The plane has a top speed of over 300 m.p.h. with a Pratt and Whitney Twin Row Wasp engine. This speed, coupled with its adequate fire power from seven machine guns, would make it possible to use the plane as a defensive weapon, a fighter, or a dive bomber. It is capable of carrying several hundred pounds of bombs on racks under the wing. A large bomb of 300-500 pounds can be suspended under the fuselage and 100 pound bombs to each side, for a total of about 1000 pounds bomb load.

All-metal in construction, the AT-12 is designed so that flight loads are distributed over the entire wing. The wing construction consists of multiple spars and beams, and no one beam carries a critical load. Even if the wing and fuselage were riddled with bullets, the plane could be flown unless a number of vital parts were struck. Gasoline is carried in the wing itself and not in separate tanks. One advantage of this is the saving in weight and an inherent buoyancy which would permit the plane to float, adding safety for operation over water.

The number of machine guns carried is optional. Provision is made on the nose for four .50 caliber guns, interchangeable with .30 caliber; these are synchronized to fire through the propeller disk. A machine gun can also be mounted in each wing, and a .30 caliber flexible machine gun in the rear cockpit.

Service ceiling is about 30,000 feet. It has a wingspan of 36 feet, is 26 feet long, and measures almost 10 feet in height.

The AT-12 is basically identical with all former Seversky models, both in structure and in aerodynamic design.



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MARS · MARTIN PB2M-1

THE MARTIN MARS, the world's largest flying boat, was designed as a long-range patrol bomber but is now being converted into a cargo freighter, designated the JRM-1. When officially launched, the Navy's huge 140,000 pound seaplane rose from the waters of Chesapeake Bay with majestic sureness, and performed every maneuver required of her.

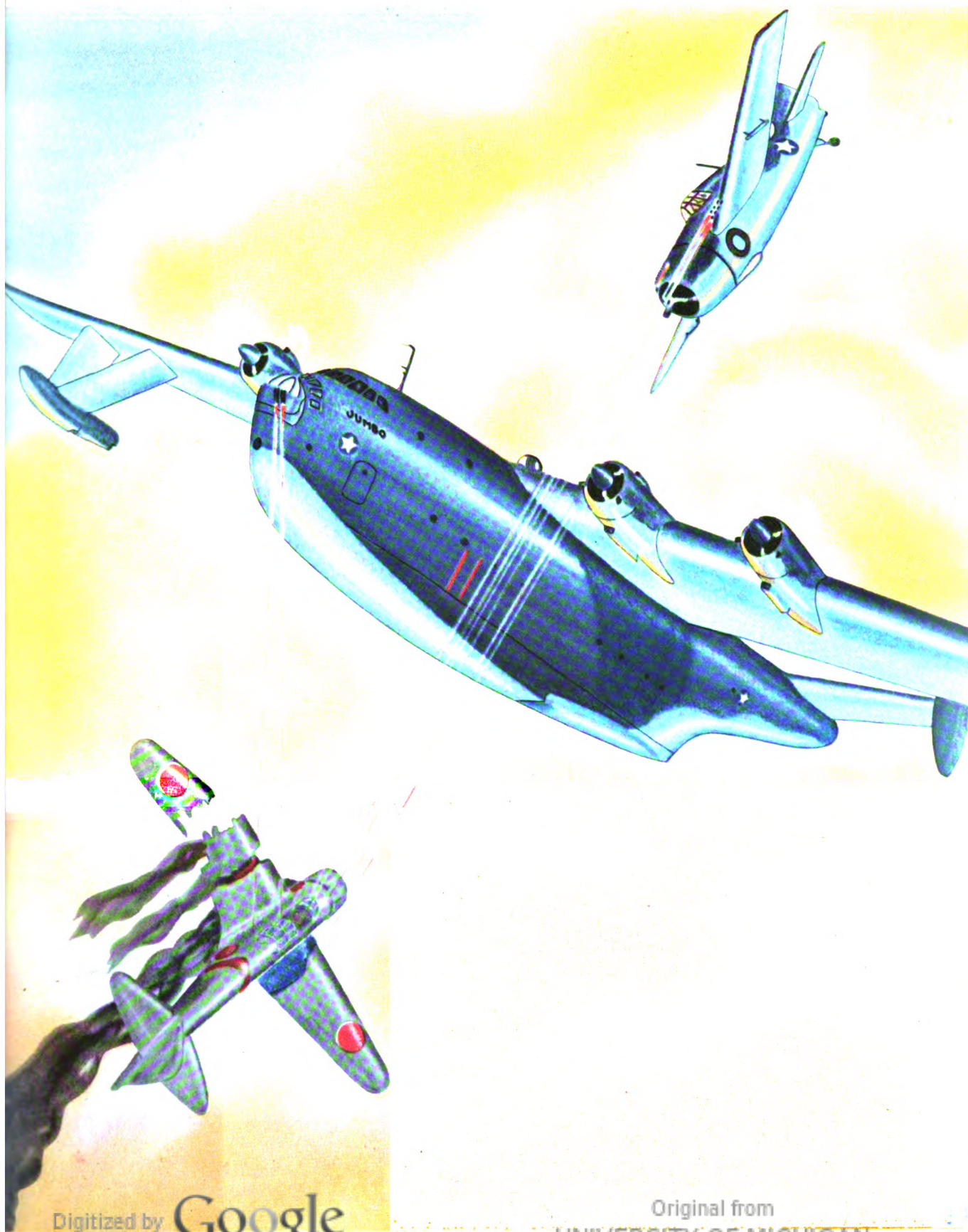
The Mars has a wingspan of 200 feet. Over-all length is 117 feet, height 36 feet, and height to top of hull 24 feet. The beam is 13½ feet and the maximum draft is 5 feet. The cubic content of the hull alone (16,667 cubic feet) is about equal to that of a fifteen-room house, and the gross displacement is 995,000 pounds. To give some idea of the proportions of the wings, the center sections are of sufficient depth to enable the crew to walk upright in them to service the engines in flight. The weight of the wings is 20,000 pounds.

The Mars has 8000 h.p., mounting four Wright Cyclones—their aggregate power is more than twice that of a Diesel-electric railroad locomotive. The three-bladed Hamilton Standard propellers are 17½ feet in diameter.

There are two full decks throughout the hull, giving the Mars the rating of a "flying ship." She carries a normal crew of eleven, although there are sleeping accommodations for thirteen. There are two messrooms and two shower baths, and a telephone intercommunicating system with twenty-four stations is a part of the equipment. A spacious wardroom is provided for the officers, while the commanding officer has his own desk on the bridge and his own stateroom. Life aboard the Mars is much the same as on surface naval vessels.

The war-service possibilities of the Mars are significant. She can fly to Europe and back nonstop. As a troop transport she could carry one hundred and fifty men, with their arms. Aircraft of this size, and larger, can actually compete in cargo-carrying efficiency with surface ships, because of the greater frequency of trips.

The Mars was the first flying ship ever awarded Navy keel-laying honors, reserved formerly for surface vessels.



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MARS MARTIN PB2M-1

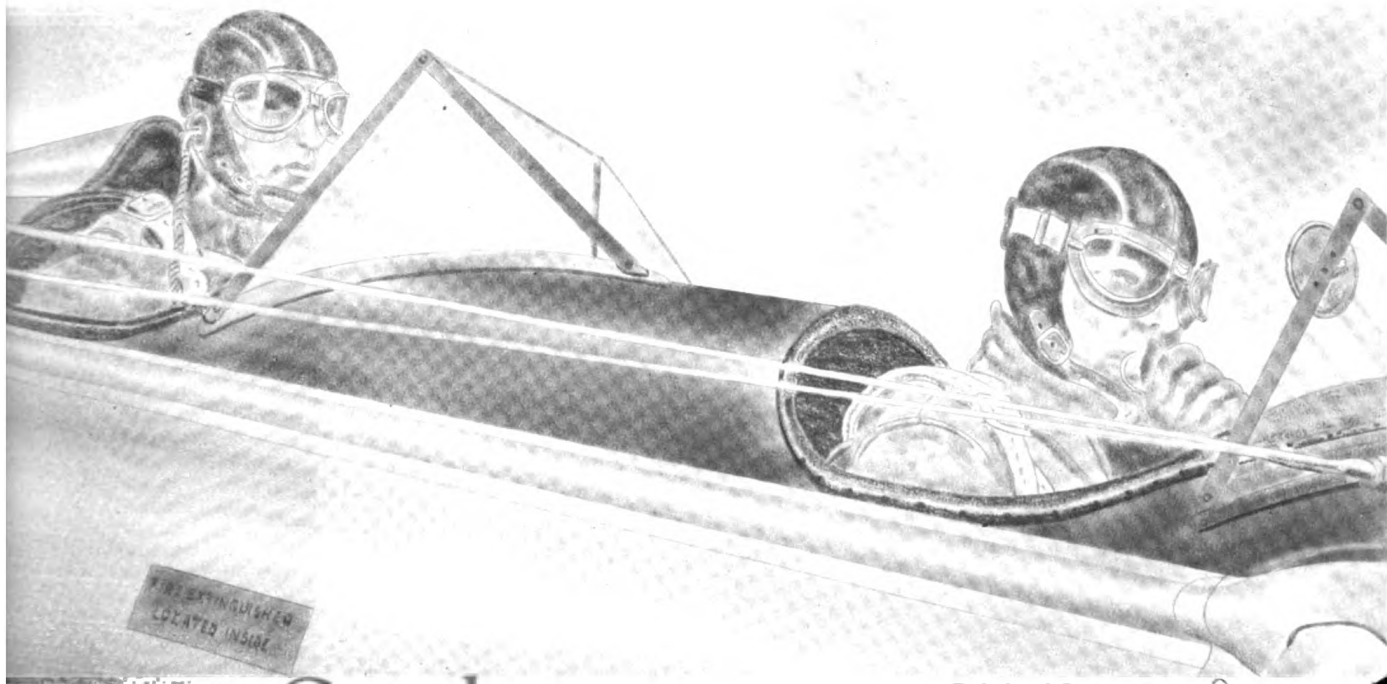
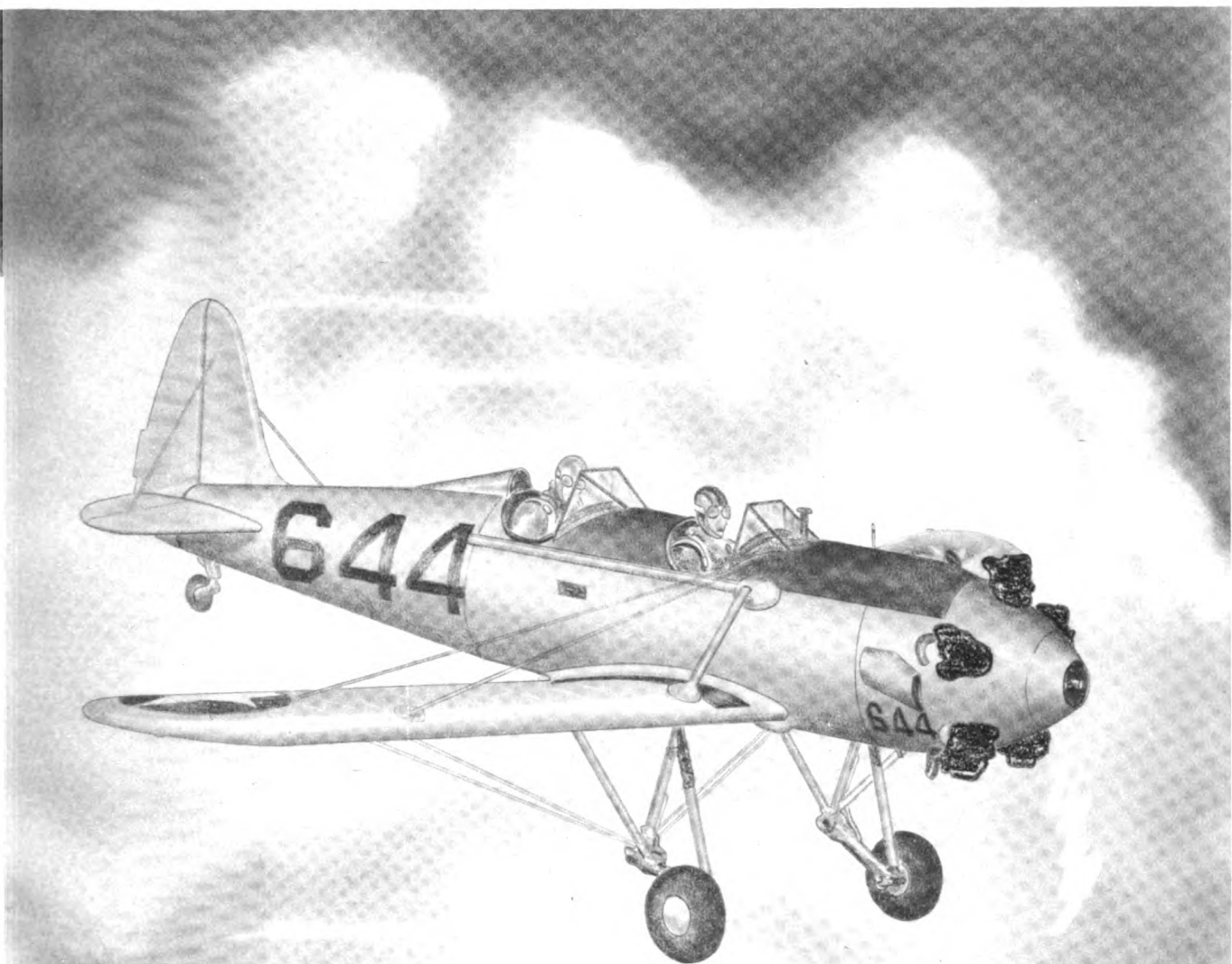
RECRUIT · RYAN PT-22

KNOWN TO THE NAVY as the NR-1 and to the Army as the PT-22, the RYAN primary trainer is of very rugged construction and has never been known to have a structural failure due to loads imposed during flight.

Although the PT-22 lands faster than any other primary trainer, its characteristics are such that students master landing techniques more easily with it than they did with the slower biplane which the RYAN replaced. It has very good brakes, and only the most determined application of them could turn it over on a landing roll. Brakes can be used in conjunction with rudder action to prevent ground looping; but if one uses the rudder properly on the landing roll, the plane has no ground-looping tendency. In the RYAN, snap rolls are very fast and clean; slow rolls can be executed without too much pressure being needed to put the stick forward in the inverted position. It fuzzes out of a loop at the top and "granddaddy"-type chandelles are substituted for student training to replace Immelmans, as this maneuver can be executed in the PT-22 only after a lot of practice or previous experience. The engine does not cut out in rolls to the right; so rolls are somewhat easier in this direction, as the propeller keeps more air pressure on the surfaces.

Visibility over the nose leaves something to be desired in training, with all the traffic encountered around a primary training school, and the engine is very rough. Most instructors, however, prefer the RYAN to the biplane it replaced.

The PT-22 is all-metal except for the wing spars, which are spruce; wings and tail surfaces are fabric-covered. Power is by a Kinner engine of about 150 h.p. at 1800 r.p.m. Top speed is 120 m.p.h. and cruising speed is 110 m.p.h. at 1725 r.p.m. Landing speed is 65 m.p.h., cruising range is 266 miles with 24 gallons of fuel, and gross weight is 1825 pounds.



FIRE EXTINGUISHER
LOCATED INSIDE

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Reprint. RYAN PT-22

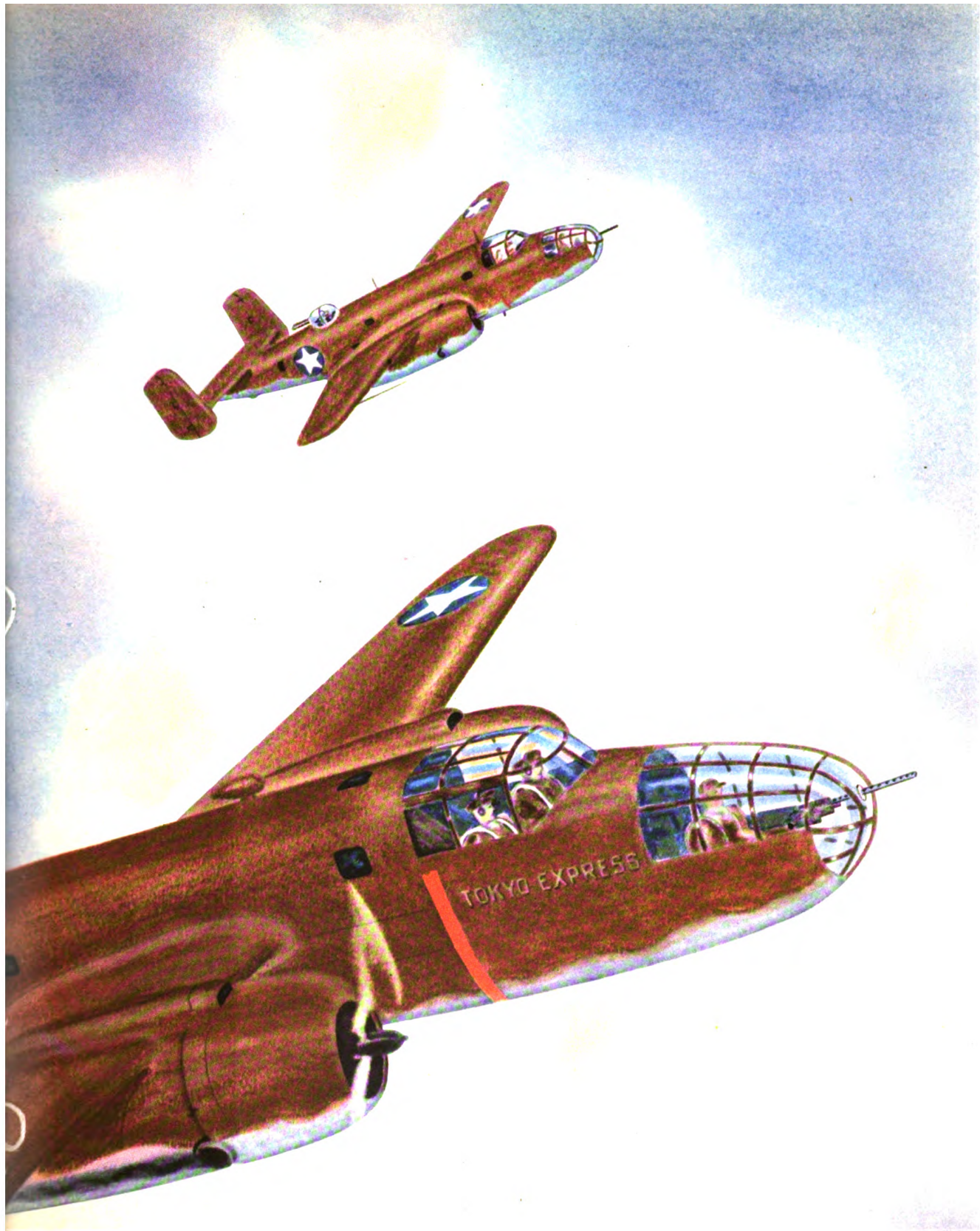
MITCHELL · NORTH AMERICAN B-25

THE NORTH AMERICAN B-25 made history when introduced to the Japanese one Saturday in April, 1942. Led by Jimmy Doolittle in a blasting raid over Tokyo and other Jap cities, the *Mitchells* laid waste to factories, docks, rail centers, and harbor installations, dropping bombs and setting huge fires with incendiaries.

The *Mitchell* is a battle-tested aircraft, with good speed, long range, and heavy load-carrying ability. No airplane of the enemy air forces is known to equal it. One of the most versatile medium bombers, it was the first to sink a Nazi submarine in the Atlantic within shore range of our aircraft; it was also the first to attack the Japs in the Philippines from a far-removed base, after the fall of Bataan. The *Mitchell* is used for high-level bombing but is most effective when used in attack, coming in low and fast, dropping its bombs with deadly accuracy.

A high-wing full-cantilever monoplane, the wing is all-metal and the ailerons have metal frames and are fabric-covered. Wing leading edge has ice eliminators. The fuselage and tail unit are all-metal and the leading edges of the tail surfaces are fitted with deicers, for winter operations. Wingspan is 67½ feet, length is 64 feet, and height is nearly 16 feet. Powered by two Wright Cyclone double-row engines of 1700 h.p. each, the *Mitchell* has a top speed in excess of 300 m.p.h. and cruises about 220 m.p.h. Gross weight, including approximately 2 tons of bombs, is 12 tons.

There is provision for a crew of five in the *Mitchell*: pilot, copilot, bombardier, radio operator-gunner, and armorer-gunner. All members of the crew may interchange positions in the air, if necessary. The main control cockpit is forward of the propeller arcs, with the bombardier's position in the nose. Bomb stowage is inside the fuselage. The bombardier has an alternate position located aft of the pilot's seat. The radio operator-gunner and armorer-gunner are aft of the bomb bay in the fuselage. The power-operated gun turret atop the fuselage houses two .50 caliber machine guns. Some models have a tail gunner. The airplane mounts several fixed forward-firing guns in addition to the swivel-mounted gun on the nose.



SEAGULL · CURTISS SO3C

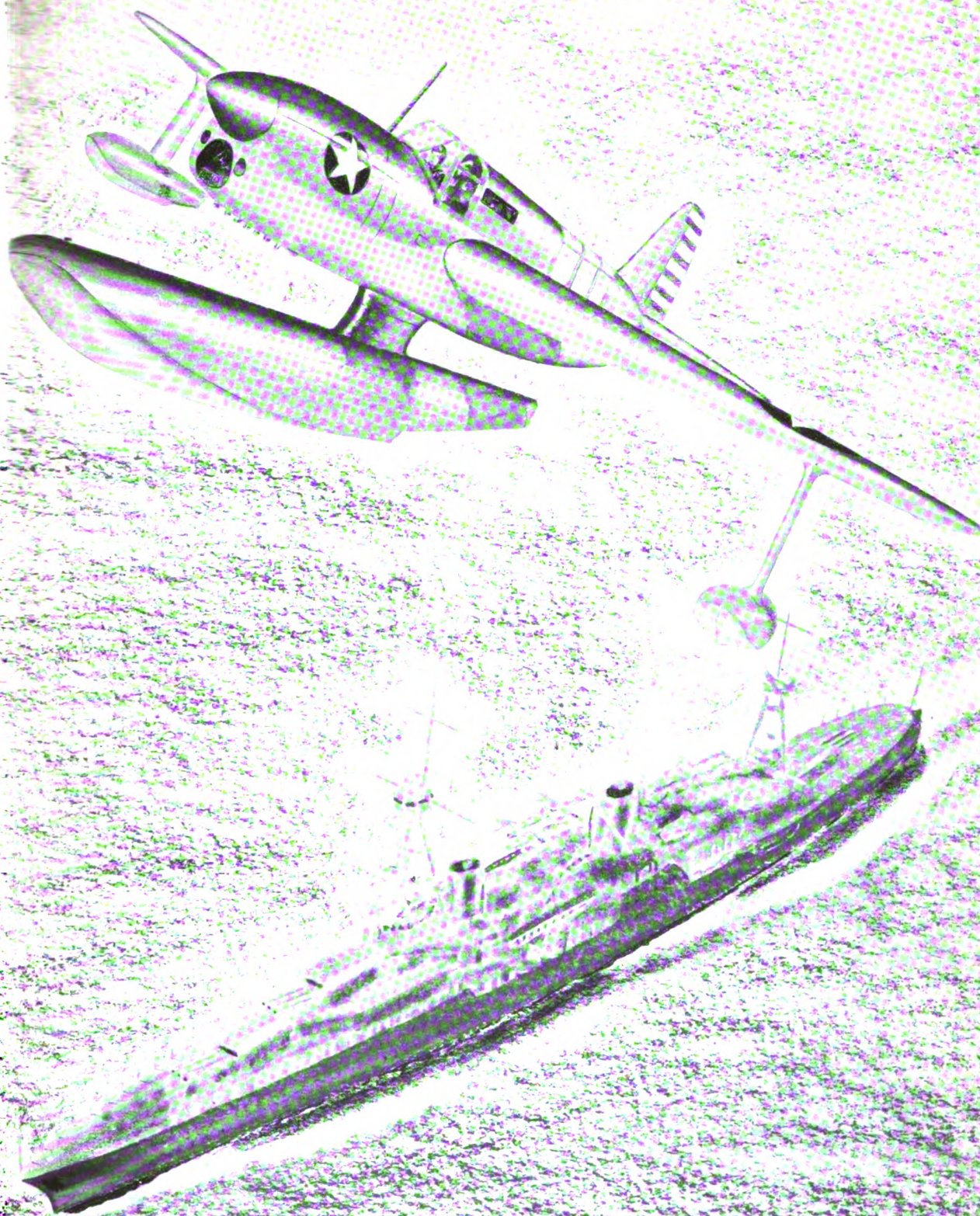
LATEST OF ITS TYPE to be built by Curtiss, the so3c is designed for catapult use aboard battleships and cruisers. It wears floats for this duty and can also be fitted with wheels for land operation.

When our big warships convoy transports, the *Seagull* is in the air on the lookout for enemy craft. In sea battles it acts as the "eyes of the fleet" and reports enemy position, effect and location of our ships' gunfire. The *Seagull* is being used also to patrol our coastal shores. For this work it is fitted with bomb racks and bombs on the undersides of the wings.

The so3c-1 model had conventional wing tips, as depicted. The later so3c-2 has a redesigned tail and novel upturned wing tips. These changes were probably made for added stability and better handling. The pilot in the *Seagull* is seated a little forward of the leading edge of the wing to give better visibility for special observation purposes.

Powered with a 12 cylinder inverted V-type Ranger engine of 520 h.p., it has a range of about 1200 miles at 140 m.p.h. Its top speed is 200 m.p.h. and its service ceiling is 23,000 feet. It mounts two .30 caliber machine guns, one, firing forward, on the engine cowl and the other mounted on a swivel in the gunner's position in the rear of the greenhouse hatch. The wingspan is 38 feet; length is 34 feet as a landplane and 36 feet as a sea-plane. Gross weight is 5588 pounds as a landplane and 5729 pounds with floats. Speed with wheel-type landing gear is faster than that with floats, because of the reduced drag.

This very useful airplane is now being produced in great quantities by several large companies and supplied to our Allies for coastal patrol, as well as to our own forces.



MUSTANG · NORTH AMERICAN P-51

MANY AMERICAN and British pilots believe that the NORTH AMERICAN P-51 will be the outstanding aircraft of its type in 1943. The *Mustang*, being delivered to the U. S. Army and England in ever-increasing numbers, is the world's fastest pursuit plane in its horsepower class. Pilots, once they have flown it, fight to be assigned to the P-51, insisting it is the fastest, the easiest to control at high speed, and one of the most comfortable planes in the service.

The design of this plane was worked out mathematically from nose to tail by what the engineers call "second-degree curve development," and it is said to be the first so designed. Built up by "laminar flow" as the design method is called, the result was an airplane superior to either the MESSERSCHMITT 109 or the famed SUPERMARINE *Spitfire*.

It is powered by an Allison engine of about 1250 h.p.; the British announce its top speed as 370 m.p.h., and United States sources say 390 m.p.h. Range, say the British, is 510 miles at a cruising speed of 310 m.p.h. Service ceiling is 31,350 feet and gross weight is 7700 pounds. Wingspan is 37 feet, length is over 32 feet, and height is under 9 feet. The *Mustang's* Allison engine is equipped with a single-stage blower supercharger, which simply means that it was not designed even to attempt to reach high altitudes. The British have placed it in service as an Army cooperation plane.

It does ground-attack work against smaller targets: locomotives and trains, barges, tugs, etc. One blast from its cannon explodes a locomotive boiler. Stripped of its armament, the *Mustang* streaks over enemy territory to take photographs before and after air raids. Heavily armed for offensive duties, the *Mustang* can mount eight .50 caliber machine guns or four cannon and two machine guns, or other combinations, depending on its use.

The latest *Mustang* is said to be capable of combat at all altitude levels, indicating that the engine is being fitted with either a two-stage or a turbo-type supercharger.



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Mustang, NORTH AMERICAN P-51
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SENTINEL · STINSON L-5

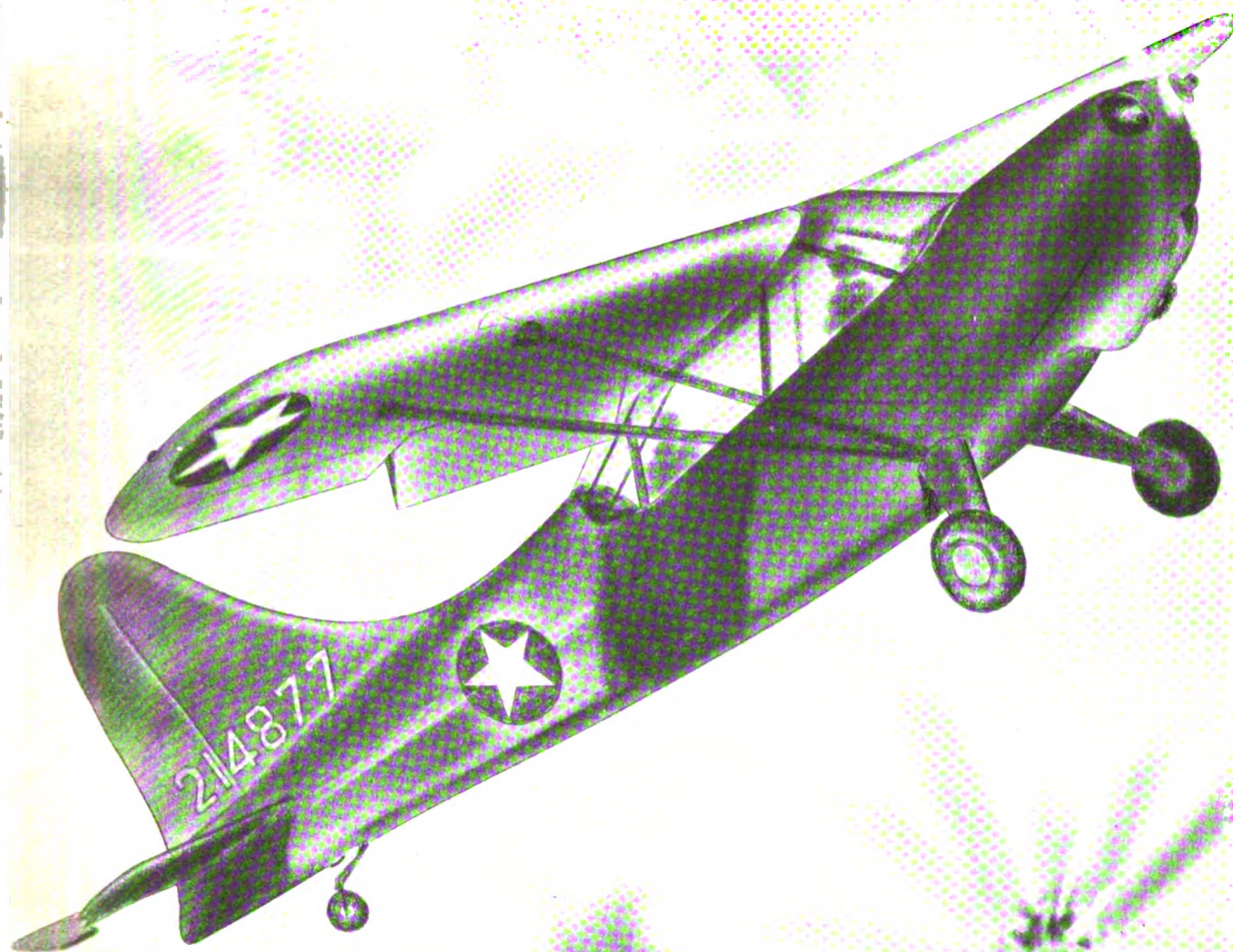
NEW TO THE RANKS of the Army's liaison-type craft is the STINSON L-5. It is replacing the VULTEE-STINSON L-1. It is much smaller than the L-1 and can perform the same duties, its smallness allowing it to be less conspicuous; it also operates much more economically, with less fuel and less maintenance.

The *Sentinel* is a redesign of the commercial Voyager 105 three-place private plane and looks very much like the Voyager except for a modification about the rear of the cabin, where extra clear plastic has been added for increased vision in its military duties.

Wing leading-edge slots and large trailing-edge flaps enable the *Sentinel* to take off and land in a short space. It is powered with a Lycoming 190 h.p. 6 cylinder opposed engine and should have a substantial increase of speed over the Voyager, which was powered with a 75 h.p. engine and which had a cruising speed of 109 m.p.h. No performance details have been released on the *Sentinel*.

The fuselage is constructed of welded steel tubing faired to a streamline contour with wood strips and covered with fabric. Wings are of solid spruce spars and aluminum-alloy ribs. Tail surfaces are of welded steel, fabric-covered. Wingspan is 34 feet, length is 24 feet, and height is 6 feet 6 inches.

Two-way radio for communication with air and ground forces should prove valuable while hovering near objectives. During World War I these duties were handled by the vulnerable "sausage" balloons. Liaison planes such as the *Sentinel* are painted completely olive-drab instead of having the undersides painted light blue. This type flies so low on its missions that it is better camouflaged among the trees and hills in its all-drab coat.



SKYMASTER · DOUGLAS C-54

THE DOUGLAS C-54 is the largest transport in mass production in this country today. Originally designed and built for use by air lines, and known as the DC-4, the Skymaster has been converted to military use under Army specifications.

The C-54 Skymaster has great range and load-carrying capacity and is playing a vital role in speeding men and materials to strategic points. Even before the first test flights were completed on this plane, additional units were already running their engines up for testing, while still others were crowding off the assembly lines. Since the first DC-4, which came out in 1938, the plane has undergone many changes. Its three rudders have become one. The wing main wheels of its tricycle landing gear are paired and are smaller than the large single wheels used on the first plane. Because of its size and the expensive engineering, the first plane cost \$2,400,000 to build.

Range, speed, and load-carrying capacity are Army secrets, but the DC-4 showed the following: Wingspan 117½ feet, length 93 feet, and height nearly 28 feet. Powered by four Pratt and Whitney engines of 1100 h.p. or more, the top speed is 259 m.p.h., cruising speed 220 m.p.h., and landing speed, with flaps, 74 m.p.h. Its rate of climb is 1520 feet a minute, and it has a service ceiling of 24,000 feet. Maximum range, with 1700 gallons of fuel and an oil capacity of 100 gallons, is 2540 miles. Fuel consumption at cruising speed is 221 gallons an hour. Gross weight is about 50,000 pounds. This huge plane can take off with full load in less than 1000 feet. It can climb to 20,000 feet on three engines, fully loaded, and on only two engines it can reach 11,000 feet. The DC-4 had spacious seating for forty-two passengers and a crew of five. The C-54 can carry many more.

Conversion of the DC-4 to a military transport is said to have increased its performance remarkably.



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Skymaster, DOUGLAS C-54A

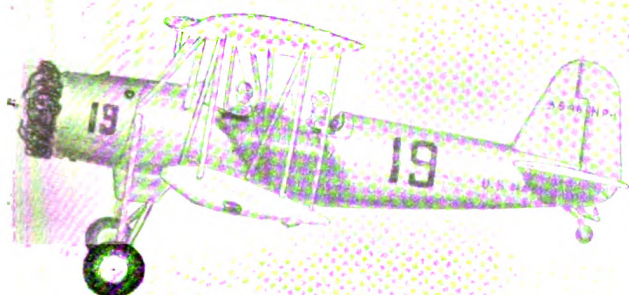
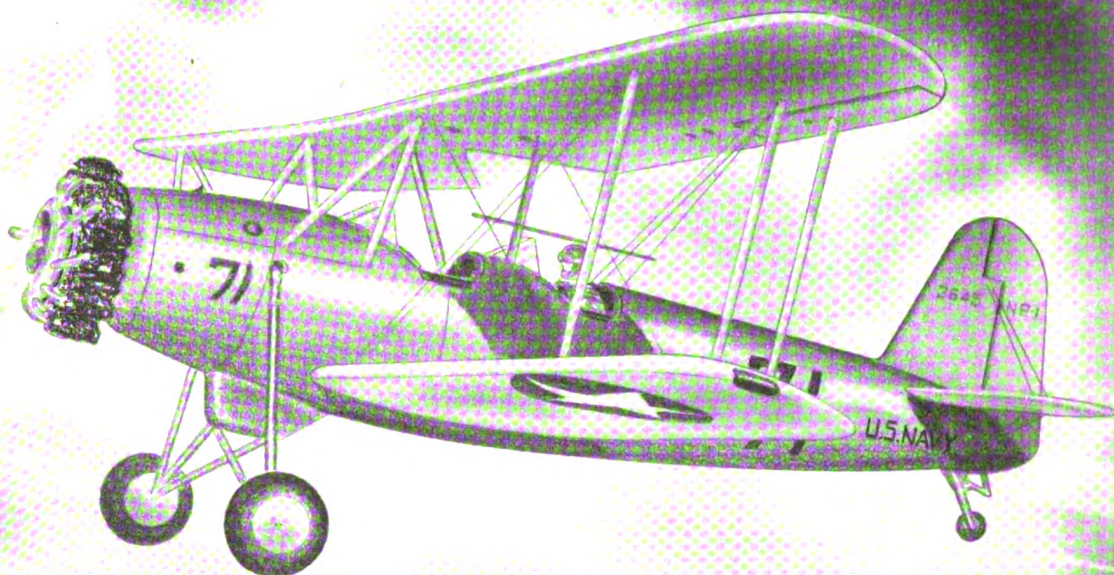
SPARTAN NP-1

USED BY THE NAVY as a primary trainer, the NP-1 is rugged in construction—to take the beating that only a student can impose on an airplane. Beginners often “land” planes twenty feet in the air and drop them onto the field, or come into the ground, roll the wheels, and bounce the planes into the air again. The primary NP-1 trainer can “take it” and taxi up to the line for more from the next student.

Although awkward in appearance, the NP-1 has good flight- and ground-handling characteristics. Beginners and instructors all like the SPARTAN, and say it is fine for acrobatic maneuvers. Wings are constructed of laminated spruce spars with spruce truss-type ribs, ailerons are of metal, and both the wings and ailerons are fabric-covered. The wings are wire-braced and the interplane struts are of steel, streamlined. The fuselage is of welded chrome-molysteel tubing faired with aluminum-alloy strips, all fabric-covered. Tail surfaces are of metal construction, fixed surfaces are metal-covered, and movable surfaces are fabric-covered. The landing gear is strongly built, with oleo shock struts to absorb heavy landing loads.

Power is supplied by a Lycoming engine of 225 h.p., which is well known as a smooth, quiet, and dependable power plant. Top speed of the NP-1 trainer is 108 m.p.h., cruising speed is 90 m.p.h., and landing speed is 47 m.p.h. Climb at sea level is 725 feet per minute. Usable ceiling is 13,200 feet. Maximum range, with 43 gallons of fuel, is 315 miles. Wingspan, upper, is over 33 feet; lower is nearly 32 feet. Length is 24 feet and height is over 8 feet. Gross weight of the airplane is 2775 pounds.

The SPARTAN NP-1 and two other trainers are the only biplane types in general use by our services, and it is very likely that all military trainers produced will be, in the near future, of monoplane design.



SKYTRAIN · DOUGLAS C-47

SKYTROOPER · DOUGLAS C-53

BOTH THE C-47 SKYTRAIN and the C-53 Skytrooper represent the DOUGLAS DC-3 Airliner, dressed for war use.

The Skytrain, with a reinforced floor bottom and large loading doors, is a good cargo carrier. The Skytrooper, fitted with jump seats, can carry passengers, parachutists, or air infantry. Planes of this type are used on the aerial India-China supply route, carrying tons upon tons of vital supplies to our Chinese allies. Alaska, Africa, and all other points of the world see these planes, and they are being turned out in increasing quantities.

All-metal excepting the fabric covering on the movable control surfaces, the DOUGLAS has a wingspread of 95 feet, a length of 64 ½ feet, and a height of 17 feet. Powered by two Twin Row Wasp engines of 1050 h.p. or more, the plane has a top speed of 230 m.p.h., cruises at 207 m.p.h., and lands at 67 m.p.h. Climb at sea level is 1130 feet the first minute, usable ceiling is 23,000 feet, and maximum range, with 822 gallons of gas, is 2125 miles. Gross weight is 25,200 pounds or more.

Optional operational equipment includes complete de-icer for winter flying, watertight wings for use over water, and oxygen equipment for use of crew and passengers when the plane is being flown over routes with high mountain ranges, as on the India-Chungking supply line. The cabin windows of the wartime DOUGLAS are fitted with reinforced holes through which rifles and submachine guns can be fired in case of air attack. Several enemy planes have been shot down or frightened off by this surprise gunfire coming from an apparently harmless cargo plane.

The Airliner DC-3 carried a crew of three and twenty-one passengers in luxurious comfort. The C-53 Skytrooper, with its folding jump seats along each side of the interior, can carry several more than twenty-one, with complete equipment. At the time of the Burma evacuation, when hundreds of persons were flown out to safety, a DC-3, flown by a Lieutenant Sartz, is said to have carried on one trip seventy-four persons and their baggage, setting up a record load for a plane in this class.



STRATOLINER · BOEING C-75

THE FIRST AIRPLANE to have a pressure-sealed cabin for practical commercial operation in the substratosphere, the BOEING model 307-B has left air-line routes and gone into war duty. Known to the army as the C-75, it is performing important transportation work—carrying vital supplies and personnel to all parts of the war-swept world.

Originally built for P. A. A. and T. W. A. air lines, the *Stratoliner* incorporates many features that will be the basis of future design. Its high-altitude characteristics have opened up a new field of air travel, bringing increased passenger comfort in the smooth upper-level air, increased speed in the thin high air, and added safety in operations well above mountainous areas and stormy surface weather. Automatic temperature and pressure devices in the sealed cabins of the *Stratoliner* create low-level atmospheric conditions for the comfort of passengers while flying up to altitudes of over three miles.

The *Stratoliner* is capable of flight on any two of its four engines. It has a flight-control compartment designed for pilot comfort and is provided with gyropilot, and a radio direction finder. Control forces are made light through use of tab controls. From an operational standpoint the *Stratoliner* is as practical as it is efficient in streamline design.

It has a wingspan of 107 feet, length of 74 feet, and height of 17 feet. Its circular fuselage measures 11½ feet in diameter. At the forward end are control posts for a five-man flight crew—pilot, copilot, flight engineer, radioman, and navigation officer. Powered by four 1100 h.p. Wright Cyclones, the C-75 has a top speed of 250 m.p.h. at 16,000 feet and a cruising speed of 222 m.p.h. at 19,000 feet; it lands at 70 m.p.h. with flaps. Climb, at sea level, is 1200 feet the first minute. Maximum range is 2340 miles. Gross weight is 45,000 pounds, with 1700 gallons of fuel and 100 gallons of oil.



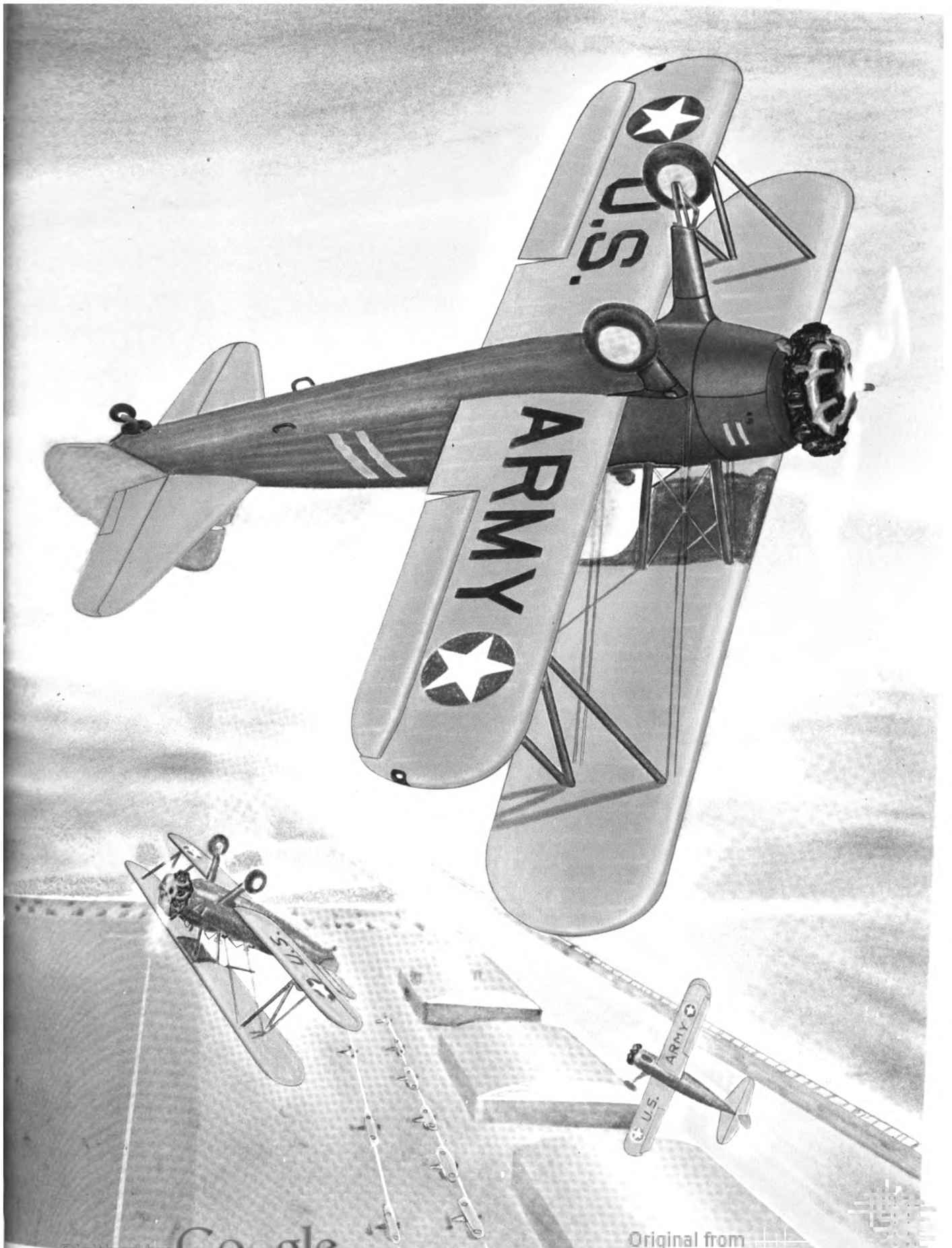
STEARMAN PT

MORE ARMY CADETS have received their primary training on the STEARMAN PT than all other makes combined. Also in quantity use by the Navy and known as an NS-1, the Army's designation is PT-13, 17 and 18, numbers varying because of different engine installations.

The STEARMAN PT will take more all around, day in and day out punishment than any other Army trainer. Its outward appearance denotes strength, but one has only to look inside the cockpits to see that the ship is built like a bridge. The tubing employed in the built-up fuselage is the size of boiler pipe, and the main member, which connects the two single cantilever-strut landing gears, is the size of a small sewer pipe. On one occasion a STEARMAN flew into telephone wires, tripped the landing gear, and landed on its back, and the student came out unharmed. Through a combination of prop wash from a preceding plane, plus pilot error, another did a half snap roll on a follow-through landing; the plane landed on its back and the student scratched a finger! Another student landed, jammed on the brakes and slammed the plane end over end, and neither the instructor nor student was harmed.

The fuselage is constructed of welded alloy tubing faired with metal strips and covered with fabric. Wings are built up of solid spruce spars, spruce ribs and fabric-covered. Wingspan, both wings, is 32 feet, length is almost 25 feet, and height is 9½ feet. Top speed of the PT-13, powered by a Lycoming 225 h.p. engine, is 105 m.p.h. and cruising speed is 90 m.p.h. Landing speed is 55 m.p.h., climb is 800 feet a minute. Service ceiling is 13,200 feet. Cruising range, with 46 gallons of fuel, is 385 miles and gross weight is 2686 pounds. Although requiring a lot of "beef" in execution, the complete list of acrobatics, and a few off the record, can be done nicely in the STEARMAN. Drop-in landings that jar the flier's equilibrium and give him a bad headache do no apparent damage to the ship.

Pilots say it will ground-loop on a landing at the drop of a hat, and that you're not through flying it until it's in the hangar. Flying instructors, however, admit their undying affection for the "clunker."



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TUTOR · TIMM N2T-1

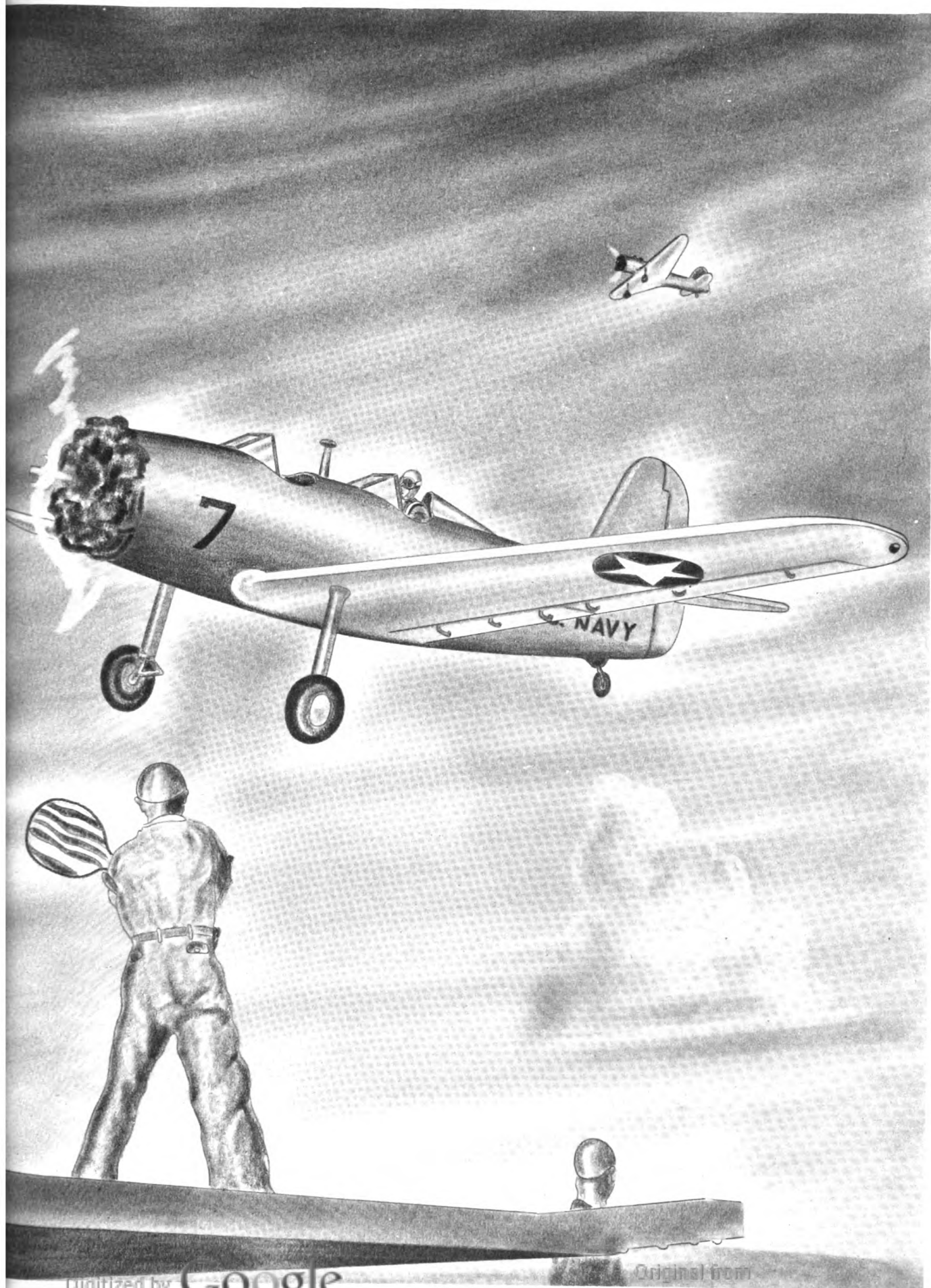
BUILT ENTIRELY OF plastic-bonded plywood, a processing of wood known as Aeromold, the TIMM N2T-1 has the distinction of being the first of its type to be purchased by the Navy.

The plane is used for the training of Navy fledgling pilots and so is built with a high degree of strength. The wings are of laminated wood spars and trussed spruce ribs and are covered with a skin of plastic-bonded plywood. The fuselage has solid spruce longerons with laminated spruce formers and the plastic-bonded skin covering. Tail surfaces are also built up of spruce and the same skin covering is employed. All materials are processed to be fireproof. A feature of the Aeromold process is that it gives the airplane a perfectly smooth surface, thus enhancing performance through being streamlined to a remarkable degree. Most of the drag is caused by the use of an air-cooled radial engine, uncowled.

Powered by a Continental 220 h.p. engine, known for its reliability, the TIMM shows a top speed of 140 m.p.h. and a cruising speed of 120 m.p.h. Landing speed without flaps is 55 m.p.h. and climb at sea level is nearly 1000 feet per minute. Usable ceiling is 19,000 feet. Length is over 24 feet, wingspan 36 feet, and height 10½ feet. Gross weight is 2650 pounds and cruising range is over 300 miles.

For the duration of the war this plane and most of the other trainers, especially primary ones, will be built mainly of plastics and woods, thus releasing vital aircraft metals for the production of faster combat and tactical craft.

Flight instruments, as on all Service trainers, consist of a compass, altimeter and airspeed indicator; engine instruments—tachometer, oil pressure and temperature gauges, and a fuel pressure gauge. All instruments are duplicated in both front and rear cockpits. The engine is fitted with either a hand inertia or electric starter, and the TIMM has provision for a battery and landing lights.



THUNDERBOLT · REPUBLIC P-47

THE REPUBLIC P-47 was designed in September, 1940, as a result of an informal conference, at Wright Field, as to what leading experts and test pilots would like to see included in the ideal fighter plane. Within eight months the prototype P-47 was test-flown. A year later, and the improved P-47D was in production; it is now being turned out in quantity.

A big, tough package of fire power, the *Thunderbolt*, according to an OWI report, is a design of the highest promise and is probably destined to become one of the outstanding planes of the war. Tests indicate that performance of this powerful fighter plane is all that was anticipated.

Its wingspan is 40 feet; it is 35 feet long and measures nearly 13 feet in height. Powered by an 18 cylinder Pratt and Whitney Twin Row Wasp engine of 2000 h.p., it is one of the few fighter craft to be equipped with the famous exhaust-driven turbo-supercharger, which enables it to operate at peak efficiency at extreme altitudes. Fuel capacity is sufficient to enable it to convoy bombers several hundred miles and return, instead of having to leave them partway as do most present-model pursuits. This is a devastating fighter, mounts eight .50 caliber guns, and is very heavily armored against enemy fire power.

The P-47's top speed is definitely over 400 m.p.h. and it will be at its fastest between 25,000 and 30,000 feet, though the supercharger gives effective operation up to 40,000 feet. It is a heavy pursuit plane, weighing over 13,000 pounds—about twice that of other pursuits and more than two and one-half times the weight of a Zero. Despite this weight it is said to be surprisingly maneuverable; it can make sharp turns, and lands at reasonably slow speed. Both take-off and climb are breathtakingly fast and it has been dived at 725 m.p.h.

The *Thunderbolt*, despite many modern and ingenious features, is of tried and proved design. It traces its lineage back through the P-43 and the P-35. In its first battle test over North Africa it justified its heritage and the faith of its designer, Kartveli.



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VALIANT • VULTEE BT-13 & BT-15

THE VULTEE BT-13A and BT-15 are replacing older trainers of this monoplane type and are coming off the assembly line in ever-increasing numbers. These are the planes on which more students take basic training than on any other design.

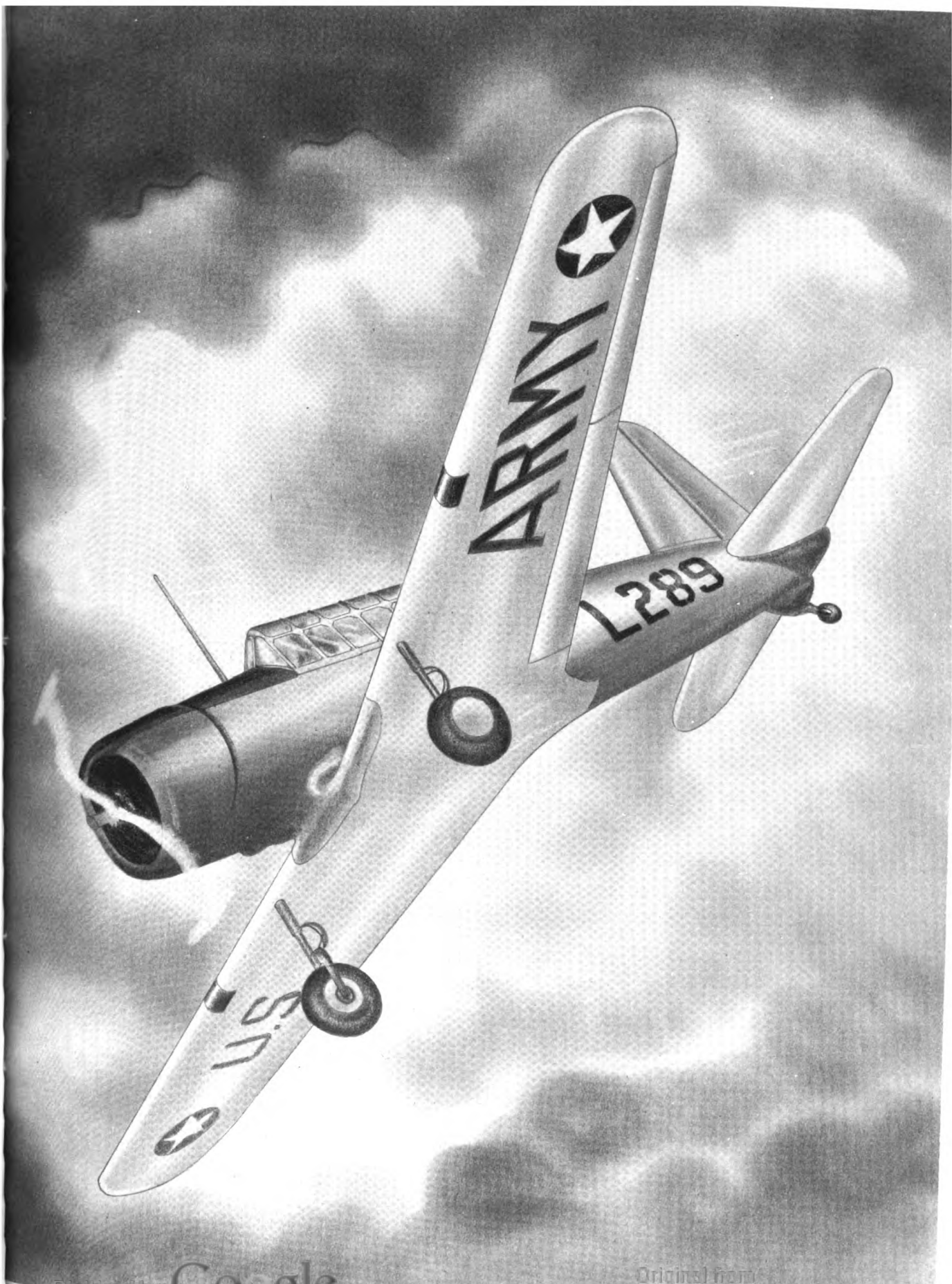
The BT-13 and BT-15 differ only in engine installation. Visibility from both cockpits is good for this type of plane; it is smooth in operation and has very good ground-handling qualities due to its wide-set landing gear.

The *Valiant* is all-metal except for fabric-covered movable tail surfaces. The BT-13A is powered by a Pratt and Whitney engine of 450 h.p. and the BT-15 has a 450 h.p. Wright engine; this horsepower is available on both for take-offs. Fuel capacity is 120 gallons, oil capacity 11 gallons. Wingspan is 42 feet, length is 28½ feet, and height is 9 feet. Top speed is around 150 m.p.h. and cruising speed is nearly 135 m.p.h. Landing speed, with flaps, is 65 m.p.h. Climb at sea level is 1575 feet the first minute. Usable ceiling is 21,000 feet and maximum range is 1000 miles.

The *Valiant* has the extra equipment found in a basic trainer, in addition to flight and engine instruments; radio receiving, transmitting, and direction-finding equipment; interphones; oxygen for work at high altitudes; landing and passing lights; and a blind-flying hood.

Known as the BC-3 or BC-51, several planes of the *Valiant* design were built for the Army and still are in use. Designed as a basic combat and advanced trainer, the plane had the identical appearance of the *Valiant* excepting the landing gear, which was fully retractable. It was powered by a 550 h.p. Pratt and Whitney Wasp engine, 100 more h.p. than the present *Valiant*.

Navy counterpart of the BT is the SNV, and it is used in quantity.



VENGEANCE · VULTEE A-31

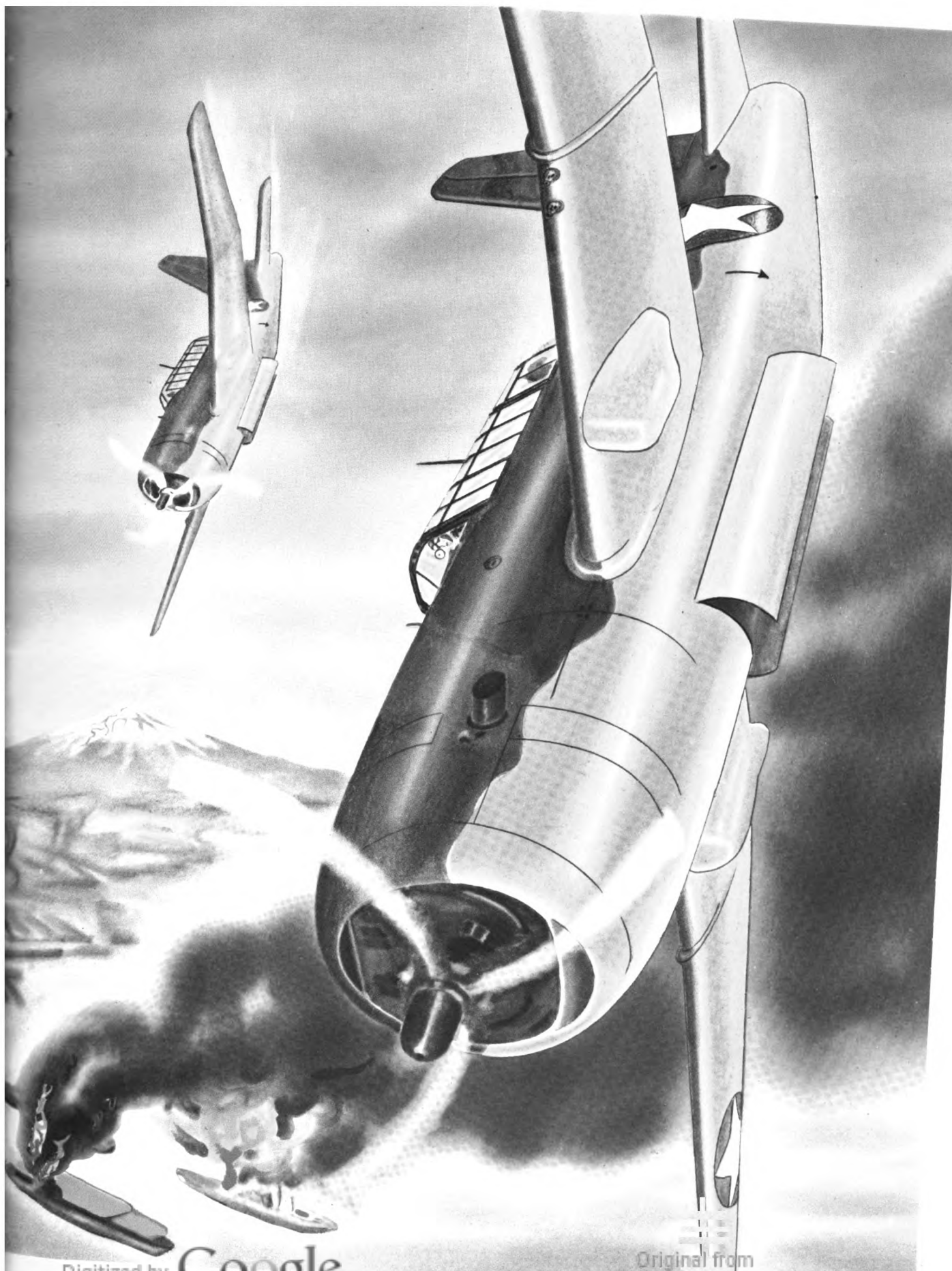
ORIGINALLY BUILT for England, our Army Air Force is now being supplied with its first real dive-bombing plane.

Designated the A-31, the VULTEE Vengeance will be used to great advantage as a ground attack plane, and will do well working with ground forces to clear the way for attack, by destroying tanks and artillery with bombs, and strafing enemy troops and gun emplacements, with its heavy machine-gun fire.

The U. S. Navy has recently ordered this airplane, designated by them TBV, to be used for torpedo and bombing duties, from both land and carrier bases. Sharing honors with the CURTISS *Helldiver* and the BREWSTER *Buccaneer*, the VULTEE Vengeance is one of the deadliest dive-bomber attack planes in the world, and is far superior to any Axis plane of this type.

All metal, the wingspan is 48 feet, it is 40 feet long and measures nearly 13 feet in height. Powered by a Wright radial engine of 1750 h.p., it has a top speed of about 300 m.p.h., cruising speed of 250 m.p.h., and a cruising range exceeding 1000 miles. Armament consists of at least four wing-mounted machine guns, and probably two swivel-mounted guns in the rear-gunner's cockpit. Bomb or torpedo load is carried inside the fuselage underside, and is nearly 2000 pounds.

Dive bombing is the releasing of bombs while in a dive. This is not an easy job but a most complex one. In order to hit a target consistently, it is necessary to use approximately the same angle of dive, and any variation causes a different point of impact for the bomb. The airplane must not skid at the time of bomb release or the bomb will then be deflected, going wide of the target. Allowance must be made for wind drift, and in the case of a moving ship or tank, for the course and speed of the target. All this must be planned, usually, while the dive bomber is diving through a hail of enemy gunfire.



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VANGUARD · VULTEE P-66

THE VULTEE VANGUARD has been delivered in considerable quantity to China and is her first-line fighter. It is a very maneuverable combat plane and dive bomber and is capable of putting up a good fight with the Jap Zero.

Known as the P-66 to our Army Air Force, this plane was designed after Howard Hughes' famous record-breaking racing plane and by the same engineer, Dick Palmer. Our *Vanguard* and the Japanese Zero bear a marked general resemblance to each other, but the *Vanguard* is finely constructed and well equipped and can absorb as much gunfire as several Zeros.

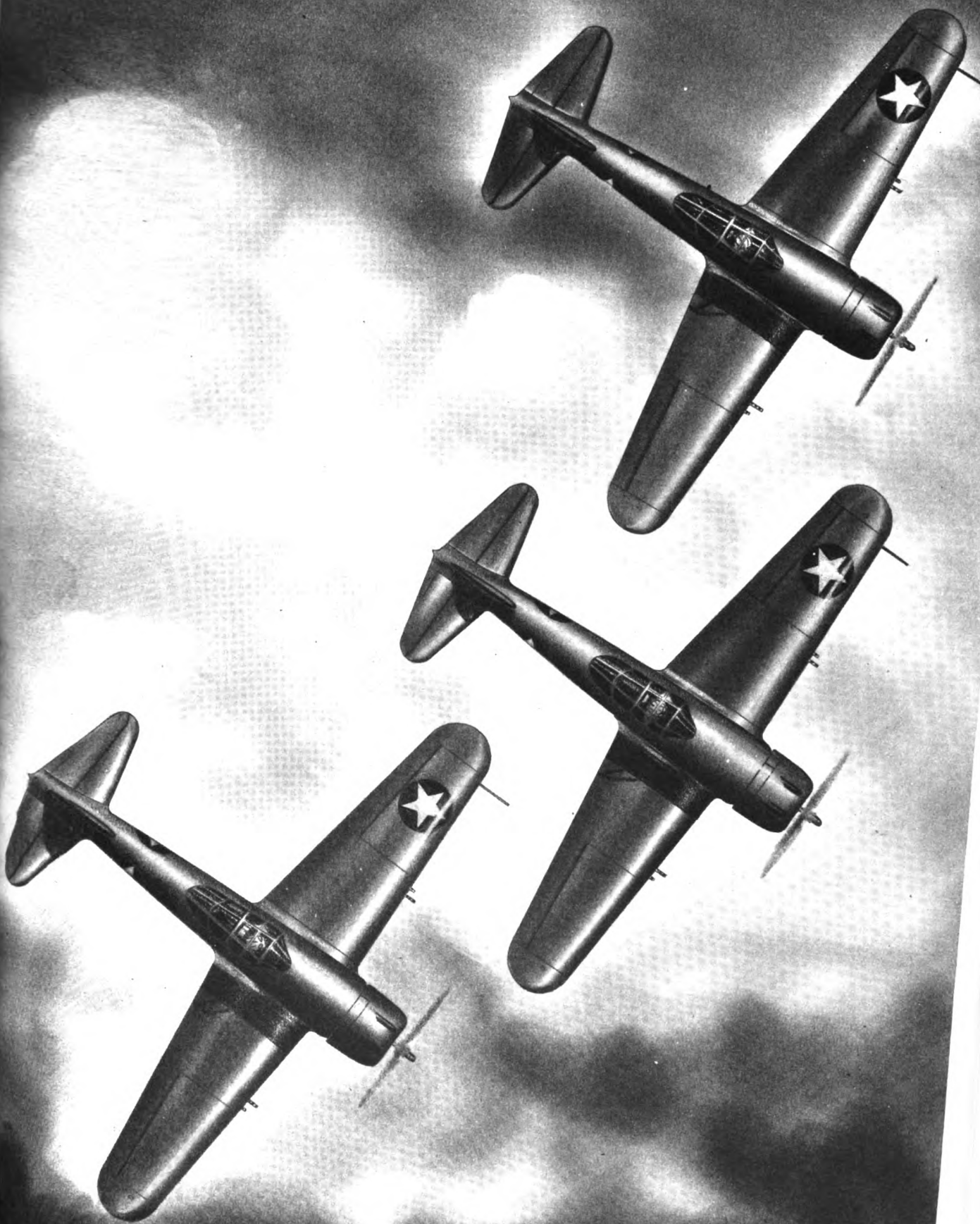
The fuselage forward section is constructed of welded steel tubing with detachable panels for maintenance; the rear section of the fuselage is semi-monocoque, all-metal. The wings are all-metal, full cantilever. All external riveting is flush and smooth, thus enhancing performance.

Engine is a Pratt and Whitney Twin Wasp and delivers 1200 h.p. for take-off. Maximum speed of the P-66 is nearly 350 m.p.h., cruising speed is 295 m.p.h. at 16,000 feet, and landing speed is 77 m.p.h. It will climb to 15,000 feet, from take-off, in five minutes. Normal cruising range is 700 miles and with a fuel overload the range is 1190 miles. Wingspan is only 36 feet, making it one of the smallest of its type; length is 28 feet and height is 9½ feet. Gross weight is 6182 pounds and normal fuel load is 139 gallons; fuel overload is 240 gallons; oil capacity is 10 gallons.

Exact armament is not published, but it includes several .30 and .50 caliber machine guns. The prototype mounted ten .30 caliber guns.

The *Vanguard's* fire power, plus its speed and maneuverability, should help the Chinese Air Force well in its fight against the "scourge of the yellow race."

The P-66 is being used by the A.A.F. as a transitional advanced trainer, in which our future pursuit pilots build up air-time before going into combat with first-line pursuit craft of higher speed and greater fire-power than the *Vanguard*.



VENTURA · LOCKHEED-VEGA B-34

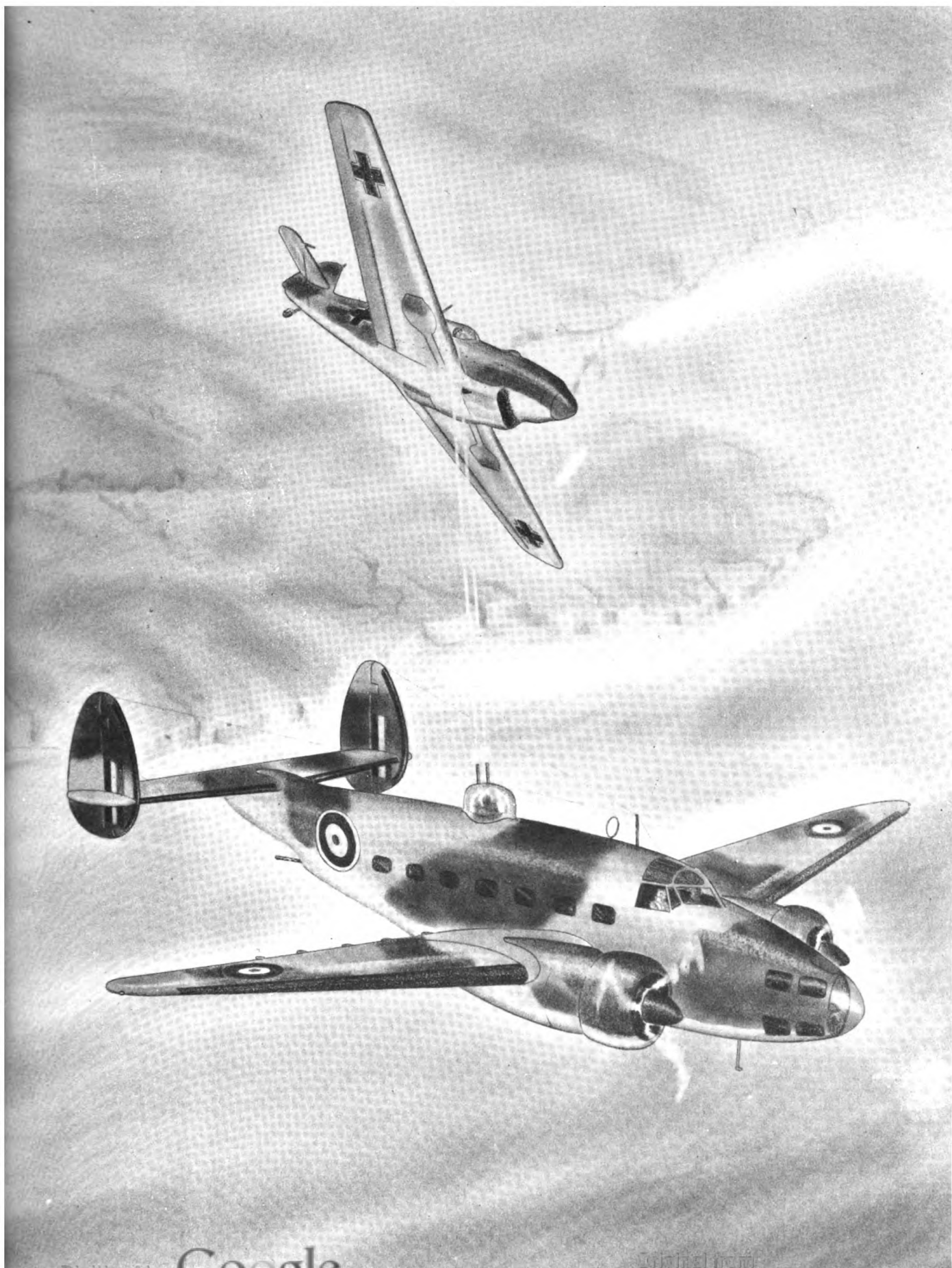
THE LOCKHEED-VEGA B-34 is a larger, more powerful, and doubly armed version of the famed *Hudson* bomber, and a military version of LOCKHEED's *Lodestar* air liner.

Bristling with armament, the *Ventura* is making devastating daylight raids over Nazi-held Europe—bombing docks, shipping, and factories in unrelenting succession. The *Ventura* goes on these raids with fighter escort or alone, being well able to ward off Nazi fighters with its array of machine guns. It is very similar in appearance and size to the *Hudson* except for the changed contour on the underside of the fuselage near the tail, where provision has been made for a gunner protected by bullet-proof clear plastic.

The *Ventura* goes into action at low levels, as well as at high, and lays its bombs with deadly accuracy. When going on raids, unescorted, the bombers fly in close formation to cover one another with their machine guns, as do the *Liberators* and the *Flying Fortresses*.

The *Ventura* B-34 is powered by two 2000 h.p. engines. All other data are restricted by our War Department and the British Air Commission. The commercial *Lodestar*, powered by two Wright engines of 1100 h.p., shows the following features and can be used for comparative purposes; the much more powerful *Ventura* will, of course, far exceed these performance figures. Top speed of the *Lodestar* is 271 m.p.h.; cruising speed is 248 m.p.h. and landing speed 70 m.p.h. Climb at sea level, 1730 feet the first minute; service ceiling, 26,000 feet; cruising range, with 644 gallons of fuel, 1670 miles. Gross weight is 18,500 pounds, probably much less than the *Ventura*'s. Wingspread is 65½ feet, length nearly 50 feet, and height nearly 12 feet.

An Army cargo version, the c-60, is like the bomber model in appearance but does not have a gunner's station on the underside or a power-gun turret on the top of the fuselage. The Navy version of the *Ventura* is the PV-1. Used for antisubmarine patrol, the plane is designed to carry not only bombs but depth charges and torpedoes and is heavily armed.



VIGILANT · VULTEE-STINSON L-1

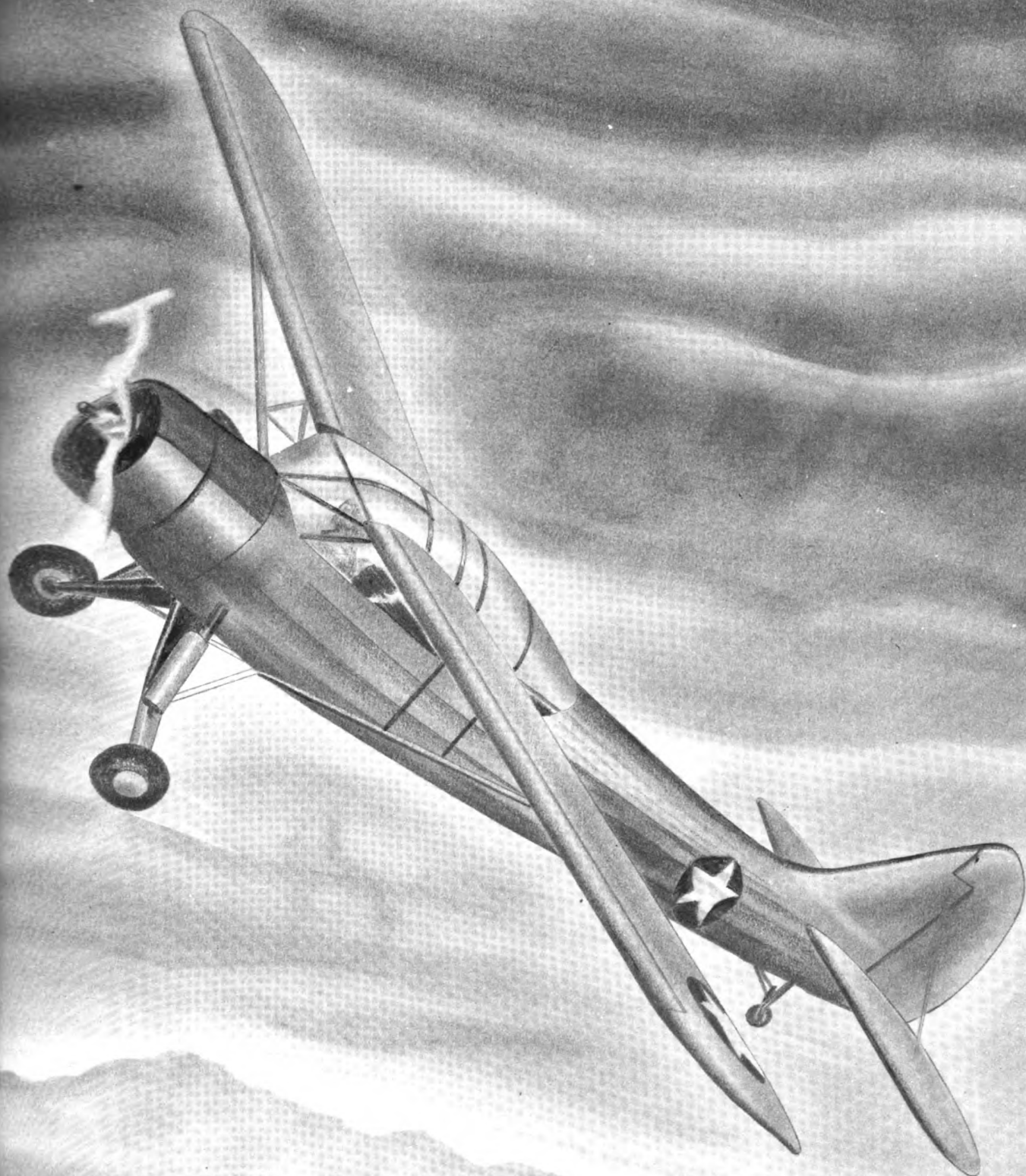
THE VULTEE-STINSON L-1 is the grandfather of all the liaison aircraft in use by the U. S. Army.

It is no longer in production because it has been found that smaller craft could do the same duties with less horsepower and, as aircraft materials are scarce, the saving is substantial.

The L-1 can land much more slowly than the smaller liaison craft, with the possible exception of the new *Sentinel* built by the same company. To see a *Vigilant* land sends cold chills up the backs of pilots who are used to seeing planes land at 35 m.p.h. or faster. With its full-length automatic wing slots and trailing-edge flaps, the "Swoose," as it has been nicknamed, comes in at a steep angle, levels off, and plumps gently down at 10 m.p.h. It can land at zero in a ten- or twelve-mile-an-hour wind, and in a stronger wind it could be brought in to land while going backwards over the ground! The plane is very hard to stall, and in a stall one simply relaxes the stick pressure and the plane recovers nicely by itself.

The *Vigilant* is a high-wing monoplane and the cockpits are enclosed with a large greenhouse canopy for good vision. Like other liaison craft it was designed for cooperation with the infantry, artillery, and mechanized units. It can also be used successfully as an ambulance plane because of its ability to get in and out of small areas.

It is powered with a 295 h.p. Lycoming engine and has a top speed of over 100 m.p.h. Wingspan is 51 feet, length is 34 feet, and height is 10 feet. The fuselage is built up of welded tubing and metal stringers and is fabric-covered. Wings are of metal spars and ribs, fabric-covered and the tail surfaces are also built up of metal, fabric-covered.



WARHAWK · CURTISS P-40F

THE CURTISS P-40F *Warhawk* is the latest model of a plane first designed in 1934. The original model, the P-36, was fitted with a Twin Row Wasp engine. Later an Allison 12-cylinder V type liquid-cooled engine was installed, and this model designated a P-40. The P-40C was called the *Tomahawk*.

Using these planes, with tiger shark jaws painted on their noses, the American Volunteer Group of fighter pilots made an outstanding record in southeast China and Burma. From December 7, 1941, until they were inducted into the American Army, these "Flying Tigers," under Colonel Claire Chennault, never had more than one hundred pursuit planes including replacements. Yet, by July, 1942, they had destroyed two hundred and twenty-five Jap planes on the ground and two hundred and seventy-two in aerial combat plus a lot of damage inflicted on Japanese supply and ground installation facilities by bombing. The figures tell the story: thirty-four Japanese planes for every P-40 destroyed; ninety-seven Japs killed for every American pilot.

It was found that the P-40 was considerably faster than any Zero encountered, and could absorb much more gunfire and still fight.

The P-40 series have a wingspan of 37 feet, length of 31½ feet and height is 10½ feet. The *Tomahawk*, P-40C, has a top speed of 360 m.p.h. at 15,000 feet, cruises at 300 m.p.h. and the landing speed is 75 m.p.h. Service ceiling is 33,000 feet and the range, with 160 gallons of fuel and 16½ gallons of oil, is 890 miles. Gross weight is 6978 pounds. Armament consists of two .50 and two .30 caliber machine guns. The *Kittyhawk*, powered by a 1150 h.p. Allison engine, mounts six .50 caliber machine guns and has higher performance. Used by the English for ground attack and mounting a 300 pound bomb and several smaller ones, it is called a *Kittybomber*. The *Warhawk*, the P-40F, wears the Rolls-Royce engine of 1260 h.p. and has a top speed reported at 380 m.p.h.

Produced in greater quantity than any other U.S. combat plane, the P-40 is in service with all our Allies and is fighting on every front.



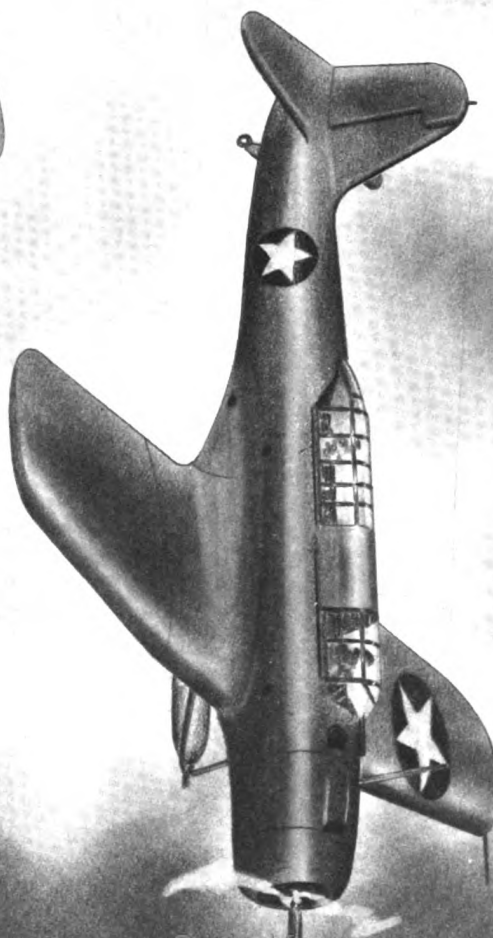
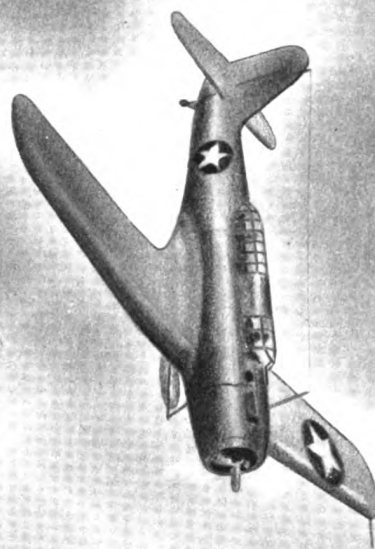
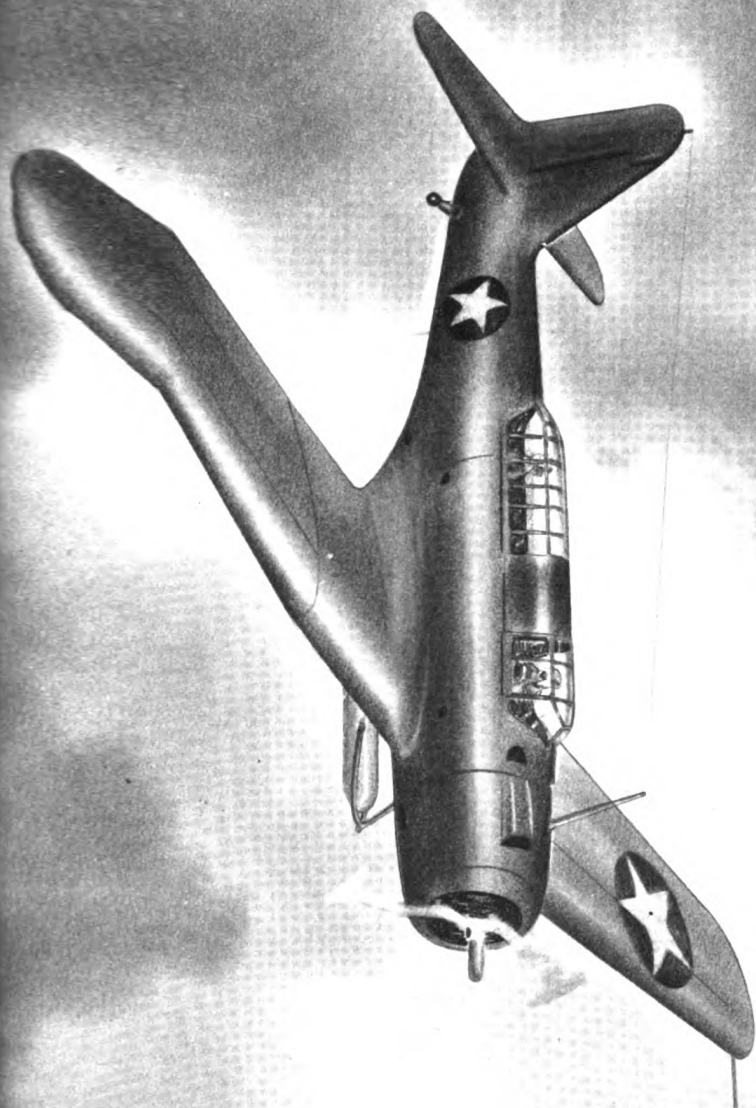
VINDICATOR · VOUGHT SB2U

THE NAVY VOUGHT SB₂U model scout dive bomber was built in 1937 but was in standard service shortly before Pearl Harbor. It is being replaced by the *Dauntless*, the *Helldiver*, and the *Buccaneer* but has already seen action in the war. Land-based on Midway Island when the Japs tried to take that island and flown by Marine pilots, this dive bomber scored two hits on an enemy aircraft carrier and one hit on a battleship.

The *Vindicator* holds the distinction of being the first low-wing monoplane type to be accepted by the Navy for operations off aircraft carriers. With folding wings, it was found to take up less space than the biplane it replaced. Landing speed, the principal drawback of monoplane types, was found to be but little more with the SB₂U, using flaps. It has also been operated, to some extent, as a seaplane, using twin floats for this purpose instead of the usual one large pontoon under the fuselage and two smaller wing-tip floats.

The *Vindicator* is all-metal excepting the fuselage covering aft of the rear cockpit, the wing trailing edge, and the movable control surfaces, which are fabric-covered. It either can carry a bomb load of 1000 pounds for offensive use or can mount, in place of the bombs, a large auxiliary fuel tank for long-range scouting. External racks for these purposes are on the underside of the wing center. Wingspread is 42 feet, length is 34 feet, and height is nearly 10 feet. Powered by a Pratt and Whitney Twin Wasp Jr. engine of 750 h.p., the *Vindicator* has a top speed of 257 m.p.h., cruising speed of 227 m.p.h. and a landing speed of 66 m.p.h. Service ceiling is 28,200 feet and climb is 1545 feet per minute. Gross weight is 6500 pounds, with 130 gallons of fuel and 11 gallons of oil. Normal range, with bomb load, is over 700 miles.

The *Vindicator* will continue to be used as a tactical aircraft because of its durable construction. It is also in use by the British Fleet Air Arm, which calls it the *Chesapeake*. This airplane has undergone three modifications, the latest designated SB₂U-3 by the Navy.



WILDCAT · GRUMMAN F4F

WHEN MARINE CAPTAINS Elrod and Tharin dive-bombed and sank a Jap cruiser at Wake Island with 100 pound bombs racked on their battered GRUMMAN F4F *Wildcats*, they made history. By the time Lieutenant "Butch" O'Hare plunged into a formation of nine bombers singlehanded, as the bombers were about to attack the *Lexington* near Bougainville Island, and within a few minutes shot down five Jap planes, the *Wildcat* was really on its way toward setting up an impressive record.

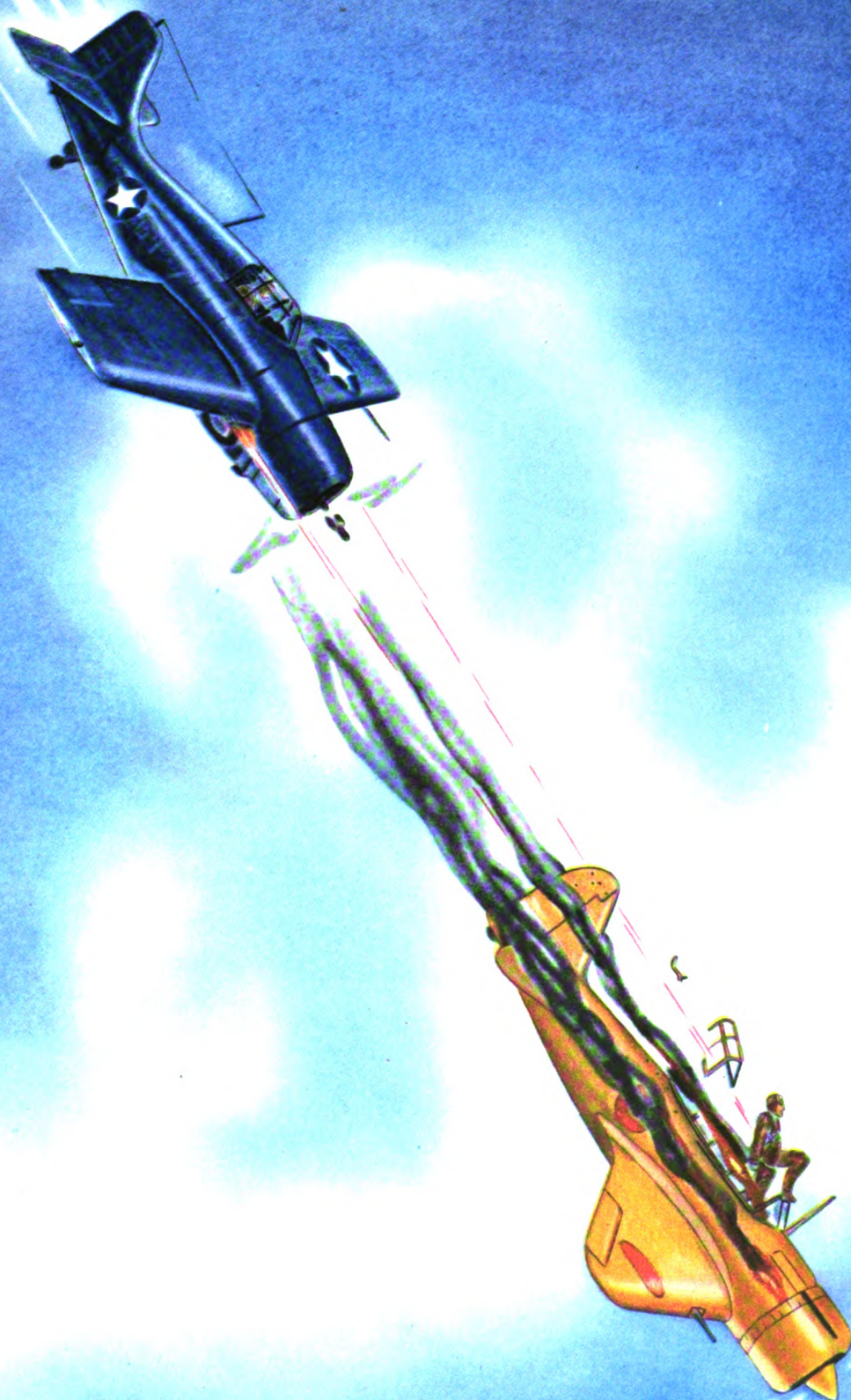
Powered by a twin row Wasp engine of 1200 h.p., the *Wildcat* is nearly as fast as the Jap Zero in level flight and can outdive it easily. The engine is equipped with a two-speed supercharger, which makes it effective at all levels. Designed for use off airplane-carrier decks, the *Wildcat* has folding wings (for storage) and deck-arresting gear; but when used as a land-based fighter it is stripped of all unnecessary weight. Unquestionably it is the best carrier fighter in battle use at the present time.

The *Wildcat* is also used by the Royal Fleet carrier-based air arm and is known as the *Martlet*.

Attesting to its fire power of six .50 caliber machine guns, it is recorded that a squadron of *Wildcats* strafed ships and ground installations at Salamaua and Lae, badly damaging a destroyer and probably sinking it by machine-gun fire alone, an amazing feat. In a recent encounter in the Guadalcanal area a *Wildcat* pilot fired into a Jap bomber at 25,000 feet, setting it on fire. Diving, he picked off another at a lower level and was busy shooting down a third plane near the surface before the first plane had hit the water.

Wingspan is 38 feet, length 29 feet and the height is a little over 9 feet. Top speed is near 350 m.p.h. It has a 35,000 foot ceiling and the normal cruising range with 160 gallons of fuel is around 500 miles. The range can be greatly extended with the use of an auxiliary belly tank. Additional equipment includes flotation gear and oxygen equipment.

No Japanese plane even approaches the *Wildcat* in "combat value."



WIDGEON and GOOSE · GRUMMAN J4F and JRF

BOTH BUILT by GRUMMAN, the J4F Widgeon and the JRF Goose are performing useful duties in the amphibian branches of our services, both at home and abroad.

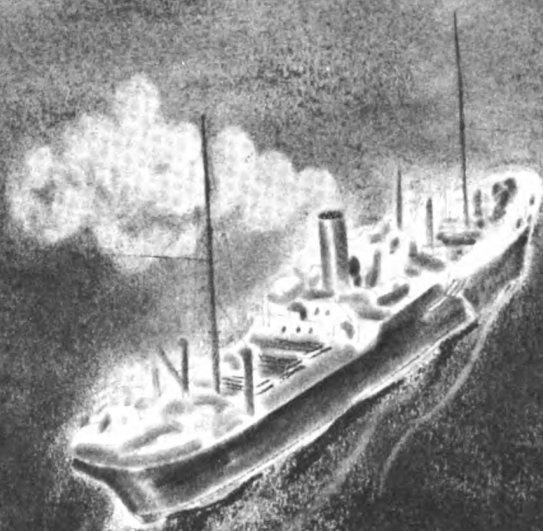
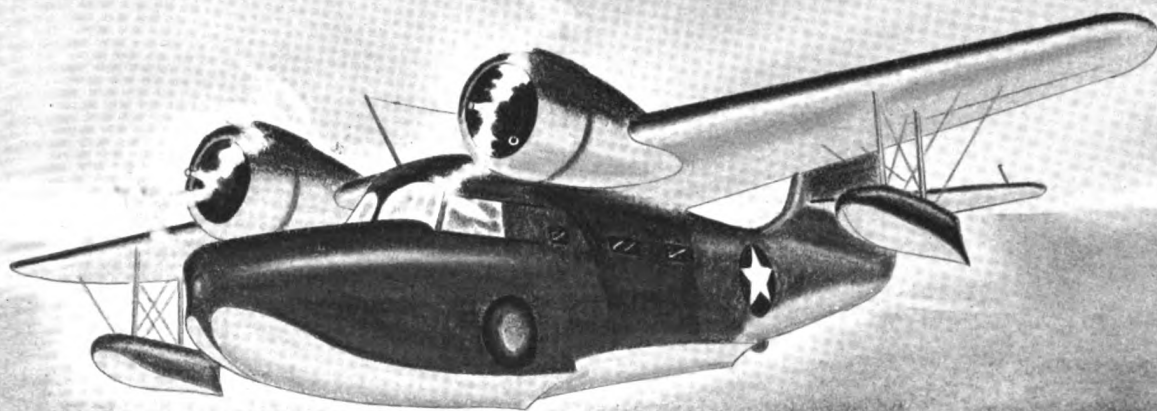
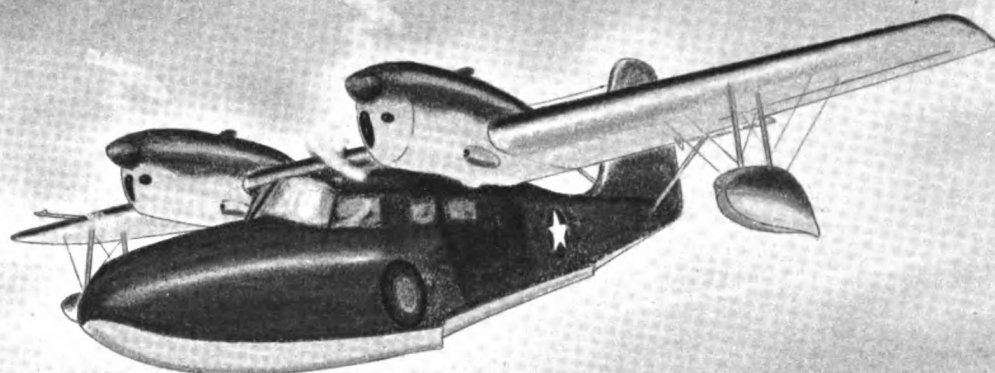
The Widgeon is used by the Coast Guard for coastal patrol and rescue work. It goes to the aid of stricken vessels, takes off the sick and wounded, and drops supplies to survivors.

All-metal excepting fabric-covered wing trailing edges and movable tail surfaces, the Widgeon is a four- to five-place amphibian. With a wingspan of only 40 feet, it is the smallest military plane of its type. Length is 31 feet and height is 9 feet. Twin engines are Rangers; are 6 cylinder, in-line, inverted, and air-cooled; and deliver 200 h.p. each. Top speed is 170 m.p.h., cruising speed is 150 m.p.h., and landing speed with flaps is 65 m.p.h. Climbing speed is 1000 feet the first minute, and usable ceiling is 15,000 feet. Range, with 108 gallons of fuel, is 840 miles. Gross weight is 4500 pounds.

The Goose is used by the Coast Guard and the Navy for photography, for scouting, and also for rescue work. Several of these planes have been delivered to Canada for coastal-defense work, and Britain's Fleet Air Arm has several for utility work. The U. S. Army Air Force version is the OA-9.

Powered by two Wasp Jr. engines of 450 h.p. each, the Goose has a top speed of 201 m.p.h.; it cruises at 190 m.p.h. and lands, with flaps, at 65 m.p.h. Climb, at sea level, is 1300 feet per minute. Usable ceiling is 22,000 feet and range, with 220 gallons of fuel, is 1050 miles. Constructed like the smaller Widgeon, the Goose has a wingspan of 49 feet; length is over 38 feet and height is 12 feet. Gross weight is 8000 pounds.

Both of these planes were designed for civil use but have been converted and modified for military duty.

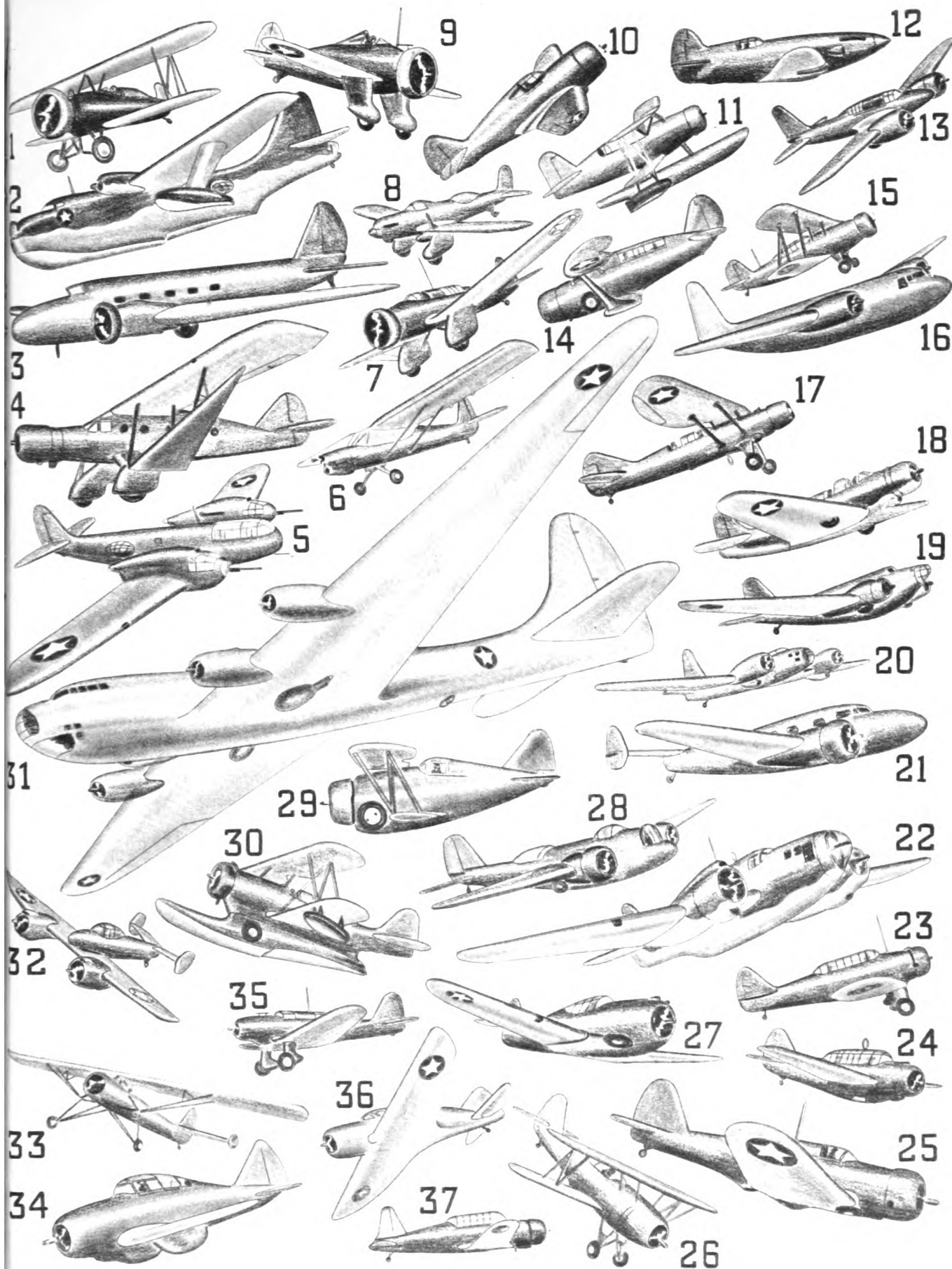


OBSOLESCENT OR SMALL QUANTITY PRODUCTION AIRCRAFT OF THE ARMY, NAVY, COAST GUARD & MARINES

The aircraft depicted are either obsolescent types or those purchased in small quantity by the Services. A few, like the GRUMMAN Skyrocket and the BELL Airacuda, are still being tested and experimented with and may yet go into production. Most pursuit and fighter planes shown were formerly our first-line combat craft, but have been retired to the role of pursuit-fighter trainers and are flown by pilots just before they are assigned to the new combat planes. The rugged and faithful MARTIN B-10's and 12's are flown during the transition period from single-engine craft to the bigger and faster attack and bombing planes, and are also used to tow targets for antiaircraft trainees on practice fire.

Although retired from the front ranks, these obsolescent planes are filling an important gap in our war program and their use through a number of years attests to the sound construction of American aircraft.

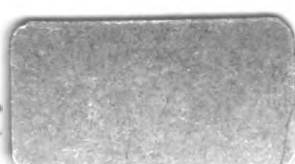
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|-------|--------------------------|--------------|--------------------------|
| [1] | Boeing P-12E | [19] | Douglas B-18A |
| [2] | Boeing XPBB-1 | [20] | Douglas B-23 |
| [3] | Boeing 247-D | [21] | Lockheed C-40 |
| [4] | Bellanca AIRBUS CARGO | [22] | Martin A-30 |
| [5] | Bell YFM-1 | [23] | North American BT-9 |
| [6] | Bellanca L-50 | [24] | North American O-47 |
| [7] | Curtiss A-10 | [25] | Northrop 17A, BT-1, A-33 |
| [8] | Curtiss A-12 | [26] | Vought SBU-1 |
| [9] | Boeing P-26A | [27] | North American P-64 |
| [10] | Curtiss P-36 | [28] | Martin B-10 & 12 |
| [11] | Curtiss SOC-3 | [29] | Grumman F2F & F3F |
| [12] | Curtiss P-37 | [30] | Grumman J2F-1 |
| [13] | Curtiss A-18 | [31] | Douglas B-19 |
| [14] | Curtiss SBC-3 | [32] | Grumman XF4F-1 |
| [15] | Douglas O-38E | [33] | Ryan YO-51 |
| [16] | Douglas DC-5 | [34] | Seversky P-35 |
| [17] | Douglas O-46 | [35] | Northrop A-17 |
| [18] | Douglas DEVASTATOR TBD-1 | [36] | Spartan EXECUTIVE |
| | [37] | Vultee BC-51 | |



INDEX TO FULL PAGE ILLUSTRATIONS

- AERONCA L-3B, Grasshopper, 65
 Airacobra, BELL P-39D, 19
 Avenger, GRUMMAN TBF-1, 23
 BEECHCRAFT F2, AT-11, JRB-1 & AT-10, 15
 BEECHCRAFT CB-1, 13
 BELL P-39D, Airacobra, 19
 Blimp, GOODYEAR TYPE K, 29
 Bobcat, CESSNA AT-17, 27
 BOEING AT-15, 17
 BOEING B-17, Flying Fortress, 55
 BOEING, C-75, Stratoliner, 117
 BREWSTER F2A-3, Buffalo, 21
 BREWSTER SB2A-2, Buccaneer, 25
 Buccaneer, BREWSTER SB2A-2, 25
 Buffalo, BREWSTER F2A-3, 21
 Cadet, CULVER PQ-8, 31
 Catalina, CONSOLIDATED PB5-5, 33
 CESSNA AT-17, Bobcat, 27
 Commando, CURTISS C-46, 35
 CONSOLIDATED B-24, Liberator, 83
 CONSOLIDATED PB5-5, Catalina, 33
 CONSOLIDATED PB2Y-2, Coronado, 39
 Constellation, LOCKHEED C-69, 37
 Coronado, CONSOLIDATED PB2Y-2, 39
 Cornell, FAIRCHILD PT-26, 41
 Corsair, VUGHT F4U-1, 43
 CULVER PQ-8, Cadet, 31
 CURTISS AT-9, 45
 CURTISS C-46, Commando, 35
 CURTISS O-52, Owl, 89
 CURTISS P-40F, Warhawk, 135
 CURTISS SB2C-1, Helldiver, 69
 CURTISS SNC-1, Falcon, 61
 CURTISS SO3C-1, Seagull, 105
 Dauntless, DOUGLAS SBD-1, 47
 DOUGLAS A-20C, Havoc, 71
 DOUGLAS C-47, Skytrain, 115
 DOUGLAS C-53, Skytrooper, 115
 DOUGLAS C-54, Skymaster, 111
 DOUGLAS SBD-1, Dauntless, 47
 Excalibur, VUGHT-SIKORSKY JRS-1, 49
 FAIRCHILD AT-13 & 14, 53
 FAIRCHILD C-61, Forwarder, 57
 FAIRCHILD PT-19, 51
 FAIRCHILD PT-26, Cornell, 41
 Falcon, CURTISS SNC-1, 61
 FLEETWINGS BT-12, 59
 Flying Fortress, BOEING B-17E, 55
 Forwarder, FAIRCHILD C-61, 57
 Gliders, 63
 GOODYEAR TYPE K, Blimp, 29
 Grasshoppers, PIPER Cub L-4B, TAYLORCRAFT
 L-2B & AERONCA L-3B, 65
 GRUMMAN F4F-4, Wildcat, 139
 GRUMMAN J4F-1 & JRF-3, Widgeon and Goose,
 141
 GRUMMAN TBF-1, Avenger, 23
 Harvard, NORTH AMERICAN AT-6A, 67
 Havoc, DOUGLAS A-20C, 71
 Helldiver, CURTISS SB2C-1, 69
 HOWARD GH-1, 75
 Hudson, LOCKHEED A-29A, 79
 Kingfisher, VUGHT OS2U-1, 73
 Lancer, REPUBLIC P-43, 77
 Liberator, CONSOLIDATED B-24, 83
 Lightning, LOCKHEED P-38, 87
 LOCKHEED A-29A, Hudson, 79
 LOCKHEED-VEGA B-34, Ventura, 131
 LOCKHEED C-69, Constellation, 37
 LOCKHEED P-38, Lightning, 87
 Marauder, MARTIN B-26C, 91
 Mariner, MARTIN PBM-3, 95
 Mars, MARTIN PB2M-1, 99
 MARTIN B-26C, Marauder, 91
 MARTIN PBM-3, Mariner, 95
 MARTIN PB2M-1, Mars, 99
 Mitchell, NORTH AMERICAN B-25D, 103
 Mustang, NORTH AMERICAN P-51, 107
 NAVY N3N-3, 81
 NORTH AMERICAN AT-6A, Harvard, 67
 NORTH AMERICAN B-25D, Mitchell, 103
 NORTH AMERICAN BT-14, 85
 NORTH AMERICAN P-51, Mustang, 107
 Owl, CURTISS O-52, 89
 PIPER Cub L-4B, Grasshopper, 65
 Recruit, RYAN PT-22, 101
 Reliant, STINSON AT-19, 93
 REPUBLIC AT-12, 97
 REPUBLIC P-43, Lancer, 77
 REPUBLIC P-47, Thunderbolt, 123
 RYAN PT-22, Recruit, 101
 Seagull, CURTISS SO3C-1, 105
 Sentinel, STINSON L-5, 109
 Skytrain, DOUGLAS C-47, 115
 Skymaster, DOUGLAS C-54, 111
 Skytrooper, DOUGLAS C-53, 115
 SPARTAN, NP-1, 113
 STEARMAN, PT-13B-17 & 18, 119
 STINSON AT-19, Reliant, 93
 STINSON L-5, Sentinel, 109
 Stratoliner, BOEING C-75, 117
 TAYLORCRAFT L-2B, Grasshopper, 65
 TIMM N2T-1, Tutor, 121
 Thunderbolt, REPUBLIC P-47, 123
 Tutor, TIMM N2T-1, 121
 Valiant, VULTEE BT-13 & 15, 125
 Vanguard, VULTEE P-66, 129
 Vengeance, VULTEE A-31, 127
 Ventura, LOCKHEED-VEGA, B-34, 131
 Vigilant, VULTEE L-1, 133
 Vindicator, VUGHT SB2U-3, 137
 VUGHT F4U-1, Corsair, 43
 VUGHT OS2U-1, Kingfisher, 73
 VUGHT SB2U-3, Vindicator, 137
 VUGHT-SIKORSKY JRS-1, Excalibur, 49
 VULTEE A-31, Vengeance, 127
 VULTEE BT-13 & 15, Valiant, 125
 VULTEE BC-51, 142
 VULTEE L-1, Vigilant, 133
 VULTEE P-66, Vanguard, 129
 Warhawk, CURTISS P-40F, 135
 Widgeon & Goose, GRUMMAN J4F-1 & JRF-3,
 141
 Wildcat, GRUMMAN F4F-4, 139





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